

CIRCULAR OF INFORMATION

and

State High School Course
of Study

ISSUED BY THE
Utah State Board of Education

1913

PRINTED BY THE
UTAH STATE BOARD OF EDUCATION

CIRCULAR OF INFORMATION AND OUTLINE

of

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HIGH SCHOOL COURSE OF STUDY

CHAPTER 29, SESSION LAWS OF UTAH, 1911. HIGH SCHOOL TAX.

An Act levying a State tax for High School purposes and providing the manner of appropriating the same.

Section 1. **Tax Levy for High School Purposes.** That there is hereby levied and directed to be assessed and collected annually a State tax of one-half mill on each dollar of valuation of the taxable property in the State for high school purposes; and the assessment and collection of said tax must be performed in the same manner and at the same time as other taxes are assessed and collected, and shall be apportioned to the several cities and school districts maintaining high schools as hereinafter provided.

Sec. 2. **Board of Education to be Notified.** On the first Monday in October of each year the board of education or school board of any city or school district in which a high school is established shall notify in writing the state board of education of the establishment of such high school and the intention of such city or district to claim the benefits of the high school fund.

Sec. 3. **Standard to be Fixed.** The state board of education shall by rule fix the standard upon which, and the per-

iod during the year that, high schools in this state shall be maintained in order to obtain any part of the high school fund. Such rule shall be fixed on or before the first day of May, 1911; and thereafter if such rule be amended, the amendment shall take effect on the first day of July at least one year after the date of its adoption. A copy of such rule or amendment shall be furnished to each city or district establishing high schools immediately after its adoption.

Sec. 4. Reports of Attendance. On the second Monday in June of each year, the board of education or board of the city or district in which a high school is established and maintained, shall report to the state board of education, the actual number of students enrolled who have been in actual attendance at such high school for a period of at least twenty weeks, together with the daily average attendance of the students so enrolled during such high school year; which report must be verified under oath by the president or chairman and clerk of the board. Such report shall also give such additional information as the state board of education may require in order to enable it to determine the standard of the school.

Sec. 5. Report of Funds on Hand. On the second Monday in June of each year, the state auditor shall report to the state board of education the amount there is on hand in the state high school fund.

Sec. 6. Apportionment. On the receipt of the report of the state auditor, as provided in the next preceding section; the state board of education shall apportion to the several cities and school districts maintaining high schools for the required period of time and of the standard fixed by the state board of education the amount of money then on hand in the state high school fund; such apportionment shall be made according to the number of students in attendance at each high school who have attended the period of time

required by section 4 of this act, as shown by the report of the board of education or board and immediately furnish to the treasurer of each school board, in cities or districts where any such school is maintained, an abstract of such apportionment.

The state board shall also certify such apportionment to the state auditor, and upon receiving such certificate, the state auditor shall forthwith draw his warrant on the state treasurer in favor of the treasurer of the school board for the amount to which the said city or district is entitled under such apportionment.

Sec. 7. Appointment of Inspector. The state board of education shall appoint a competent person to inspect at least twice during each school year all high schools claiming any benefits from the high school fund.

Sec. 8. Compensation and Expenses of Inspector. The compensation and traveling expenses of such inspector shall be fixed by the state board of education subject to the concurrence of the state board of examiners and shall be paid out of the high school fund upon claims properly certified by the state board of education and approved by the state board of examiners.

REQUIREMENTS OF STATE HIGH SCHOOLS.

Pursuant to the provisions of chapter 29 of the Session Laws of 1911, the state board of education has determined that the high schools of the state which comply with the following requirements shall be eligible to participate in the state high school fund:

1. Each school shall provide adequate equipment for the courses which it offers.

2. Each school shall be maintained at least thirty-six weeks per year, including holidays.

3. Each school shall give at least two years' work as set forth in this course of study.

4. Schools giving a four year course shall require of their students at least fifteen units of credit for graduation. (A unit is one-fourth of a year's work in the high school, approximately equal to one hour's recitation a day throughout the year.)

5. All students shall carry with a passing standard at least three units a year.

6. Teachers shall hold state high school diplomas or state high school certificates issued by the Utah state board of education.

7. To be eligible to enter the public high schools, students shall give satisfactory evidence of having completed a standard elementary education.

THE STATE HIGH SCHOOL COURSE OF STUDY.

Introduction.

The course of study here outlined for state high schools is of necessity very general. To each school is left the problem of selecting from the elective studies suggested that which is best suited to its local conditions. The studies are arranged in five groups for the purpose of aiding the schools in arranging well balanced courses of study; and also for the guidance of teachers and pupils in selecting studies under the elective system. Where the elective system is admitted in the high school, election should always be only with the approval of the principal or a committee of teachers, and every pupil should be required early in his course to elect studies from each of the five groups. The high school is not the place for specialization; it is rather a place for the adolescent to broaden his world and to discover his own powers. Let him try his hand and brain in each of the various fundamental divisions of thought and action.

In the tabulation of studies by years, printed in this circular, the required studies should be given in the years indicated, while the tabulation of elective studies is suggestive only. The term "required studies," as here used, means that every fully organized school shall offer these studies, and that partially organized schools shall offer all required studies here tabulated in the years of the course offered by the school. For instance, a high school offering only two years of the course must offer two units of English, one unit of Algebra, one unit of Geometry, one-half unit of Domestic Science or Domestic Art, and, if the school is not in a city of the first or the second class or in a mining district, it must also offer one-half unit of Elementary Agriculture; otherwise, it may offer, instead of Elementary Agriculture, one-half unit of General Science or Physical

Geography. A school offering only the first three years of the course must offer, in addition to the above studies, one more unit of English and a unit of American History and Civics. In four year courses, the American History and Civics may be given in the fourth year.

The state board of education has adopted the liberal policy followed by many of our leading universities, by which it prescribes but one subject for every pupil in the high school; i. e., three units of English for graduation, one course to be taken each year until the three units have been completed. Other requirements of pupils are left to the local authorities.

The primary aim of every high school should be to develop the highest type of manhood and womanhood. This must include a development of the most intelligent and patriotic citizenship, and ability on the part of the individual to co-operate with his community in bettering local civic and industrial conditions.

To aid in accomplishing this end, it is recommended that all high schools require every pupil to take one course in Group IV., Section I.; that the strongest teachers available be selected to give these courses; and that here especially an effort be made to uplift the moral standard of the school community.

While the high school exists primarily for the masses, and may educate hundreds of youths who may never attend college, every high school owes a duty to those who are seeking higher education. Every fully organized high school, at least, should offer all studies required for admission to the various college courses, also high school studies required for admission to professional courses. This will include foreign language and mathematics beyond one unit of Algebra and Plane Geometry. It is very desirable that every high school should offer courses in one or more modern languages.

Lists of text-books adopted and recommended, and lists of apparatus for the equipment of science laboratories, will be found in the Appendix.

HIGH SCHOOL STUDIES ARRANGED IN GROUPS.

GROUP I. LANGUAGES AND LITERATURE.

- Section I. **English:** Literature, Grammar and Composition, including both oral and written work (3 units prescribed).
- Sec. II. **English Literature** (1 unit). Debating ($\frac{1}{2}$ unit).
- Sec. III. **Modern Languages:** German, French, Spanish (Minimum: 2 units in any one language).
- Sec. IV. **Ancient Languages:** Latin, Greek (Minimum: 1 unit in either language).

GROUP II. MATHEMATICS.

- Section I. **Algebra (a)** (1 unit).
Plane Geometry (1 unit).
- Sec. II. **Algebra (b)** ($\frac{1}{2}$ unit).
Solid Geometry ($\frac{1}{2}$ unit).
- Sec. III. **Plane Trigonometry** ($\frac{1}{2}$ unit).
Spherical Trigonometry ($\frac{1}{2}$ unit).

GROUP III. SCIENCE.

- Section I. **Physics and Chemistry** (1 unit each).
Descriptive Astronomy ($\frac{1}{2}$ unit).
- Sec. II. **Elementary Agriculture** ($\frac{1}{2}$ unit).
General Science ($\frac{1}{2}$ unit).
Physical Geography ($\frac{1}{2}$ unit).
- Sec. III. **Zoology, Botany, Physiology or Zoology-Physiology** (1 unit each).

GROUP IV. HISTORY AND SOCIAL SCIENCE.

- Section. I. **American History** ($\frac{1}{2}$ or 1 unit).

Civics ($\frac{1}{2}$ unit).

Ethics of Citizenship ($\frac{1}{2}$ unit).

Sec. II. European (and Ancient) History (1 unit).

Modern (and English) History (1 unit).

Current History ($\frac{1}{2}$ unit).

Sec. III. Rural Economics (a) ($\frac{1}{2}$ unit).

Economics (b) ($\frac{1}{2}$ or 1 unit).

Elementary Sociology ($\frac{1}{2}$ unit).

GROUP V. ART AND INDUSTRY.

Section I. Domestic Art: Sewing and Dressmaking ($\frac{1}{2}$ unit each).

Domestic Science: Cooking, Sanitation, Home Economics ($\frac{1}{2}$ unit each).

Sec. II. Mechanic Arts: Woodwork, Metals, Plumbing, Electric Wiring.

Sec. III. Agriculture, Agronomy, Horticulture, Animal Industry ($\frac{1}{2}$ unit each).

Sec. IV. Mechanical Drawing, Industrial Art.

Sec. V. Drawing, Music.

Sec. VI. Commercial Geography.

Sec. VII. Accounting.

Sec. VIII. Stenography and Typewriting, Commercial Correspondence..

In Domestic Art, Mechanic Arts, Mechanical Drawing, Industrial Arts, Drawing, Music, Accounting, Stenography and Typewriting and Commercial Correspondence and all laboratory courses, two hours per day throughout the year is required for 1 unit of credit.

Every standard high school offering three years or more of work must offer the following courses:

Group I. Three units in Section One.

Group II. Two units in Section One.

Group III. One-half unit in Section Two.

Group IV. One unit in Section One.

Group V. One-half unit in Section One.

Total required studies, 7 units with electives to make at least four units in each year.

Standard high schools offering but two years of work must offer two units of English, one unit of Algebra, one unit of Plane Geometry, one-half unit of Domestic Art or Domestic Science, and one-half unit of Elementary Agriculture, Physical Geography, or General Science.

All high schools outside of cities of the first and the second class and mining districts are required to offer one-half unit of Elementary Agriculture in the first year.

The only subject prescribed by the state board of education for all students is English, of which one course must be taken each year until three units have been completed.

Local authorities are urged to require all students to take one unit in Group IV, Section I.

SUGGESTIVE COURSE OF STUDY BY YEARS.

First Year Studies.

Studies.	No. Units.
English (a)	1
Algebra	1
Physical Geography	1/2
Elementary Agriculture	1/2
General Science	1/2
Modern Language	1
Latin	1
European (and Ancient History)	1
Domestic Art	1/2
Domestic Science	1/2
Mechanic Arts	1/2
Drawing	1/2
Accounting	1/2
Astronomy	1/2

Second Year Studies.

English (b)	1
Plane Geometry	1
Modern Language	1
Latin	1
Modern (and English) History, or European History.	1
Civics	1/2
Botany	1
Zoology	1
Agriculture	1/2
Domestic Art	1/2
Domestic Science	1/2
Mechanic Arts	1/2
Drawing	1/2
Ethics of Citizenship	1/2

Third Year Studies.

English (c)	1
Oral Expression	1½
Modern History	1
Ethics of Citizenship	1½
American History	1½
Civics	1 or 1½
Algebra (b) and Solid Geometry	1
Chemistry	1
Physics	1
Modern Language	1
Ancient Language	1
Agriculture	1½
Domestic Science	1½
Mechanic Arts	1½
Music	1½
Rural Economics	1½
Commercial Subjects.	

Fourth Year Studies.

English (c)	1
Oral Expression	1½
English Literature	1
Debating	1½
American History	1½
Civics	1½
Ethics of Citizenship	1½
Economics	1 or 1½
Elementary Sociology	1½
Physiology	1½
Zoology-Physiology	1
Chemistry	1
Physics	1
Descriptive Astronomy	1½
Trigonometry, Plane	1½

Trigonometry, Plane and Spherical	1
Modern Language	1
Ancient Language	1
Domestic Science	1½
Mechanic Arts	1½
Agriculture	1½
Music	1½
Commercial Subjects.	

OUTLINES OF STUDIES.

LANGUAGE AND LITERATURE.

ENGLISH.

Three units of work in English are required by the present course of study. These may be completed during the first three years, or, at the option of the teacher, may be distributed over the four years of school work. In addition to the prescribed work, one unit in English Literature, one-half unit in Oral Expression, and one-half unit in Debating are outlined. Few schools desire or are prepared to teach English Literature, but the demand is quite general for a half-unit in each of the other subjects.

The course of study in English in the best high schools of the country provides for work of three kinds: (1) The reading of standard pieces of English literature; (2) the study of the more difficult facts and principles of English grammar; (3) systematic instruction and practice in English composition.

1. **Reading.** The readings usually attempted are those recommended for use in high schools by the College Entrance Examination Board in English. They include two lists of books—one of books for careful study, and one of books for general reading. Among them are pieces of literature of almost every essential variety and from almost every historical period; the cumulative results of all this reading and study should insure a fairly comprehensive grasp of the history and development of English literature. The books both for careful study and for general reading are named under the outline of work for the three years.

2. **Grammar.** Experience has shown that English Grammar as taught in the grades is not of sufficient thor-

oughness to justify its omission from a course in high school English. In truth certain aspects of Grammar are unquestionably too difficult to be grasped and applied by the average eighth grade pupil. Somewhere in the high school course, therefore, the vigorous teaching of this subject is imperative. Emphasis, however, should be placed on composition and on the readings, and constant application of the grammatical principles that are being learned should be made to the written work.

3. **Composition.** The main concern in the work in composition should be to teach the pupils to express in simple English, and correctly and logically, whatever thoughts they are capable of expressing. To this end, short compositions should be required at least weekly throughout the course as well as occasional longer ones. The subjects should usually be assigned by the teacher. The assignment may present a number of subjects affording to the pupil some latitude of choice. Such assignment should be carefully prepared by the teacher beforehand and should be of a kind to stimulate in the pupil a desire to write. Devices by which the teacher may surround subjects with interest are numerous. Subjects may be suggested by the work in literature or by other studies which the pupils are pursuing, or they may be drawn from the pupil's own experience and observation. The latter kind of subjects have the advantage of stimulating a more simple and original style of writing and should, therefore, form the greater number of subjects assigned.

Criticism should be constant and thorough and should take account of merits as well as of faults. Corrections and suggestions on the themes should be supplemented by regular personal conferences between the teacher and the pupil.

During the early part of the course instruction in the principles of composition may be presented incidentally. The instructor in assigning work may effectively offer hints as

to the proper way to go about various tasks in writing, and as to the selection and arrangement of material, and his criticisms before the class and in personal conferences should deal constantly with the arrangement of clauses in the sentence and of sentences in the paragraph, and with the need of care in the choice of words and in such more elementary matters as spelling and punctuation. Later in the course the definite study of elementary rhetoric may well enough accompany the practice of writing. "At no time," declares the Committee of Ten of the National Educational Association, "should rhetoric be studied by itself or for its own sake; its connection with the pupil's actual written or spoken exercises should be kept constantly in view."

The outline which follows should not be regarded as inflexible. Conditions prevailing in any particular school—ability of students, preparation of teachers, library facilities—will necessarily suggest modifications.

First Year—English (a).

Classics—For careful study: "Merchant of Venice," or "Julius Caesar," Scott's "Lady of the Lake" or "Marmion," Selections from Irving's "Sketch Book" or Scott's "Ivanhoe."

For outside reading, select any three of the following:

1. Prose translation of Homer's *Odyssey*.
2. Cooper—*Last of the Mohicans*.
3. Cable—*Old Creole Days*.
4. Clemens—*Huckleberry Finn* or *Tom Sawyer*.
5. Defoe—*Robinson Crusoe*.
6. Bret Harte—*The Luck of Roaring Camp*.

2. The aim of the grammatical study of the first year should be to teach the student both to know a good sentence when he sees it and also to write one. Systematic drill on the structure and use of the sentence ought to awaken so keen a sense of propriety as to keep a student

forever from writing an incomplete sentence, a sentence in which there is a want of agreement between verb and subject or between pronoun and antecedent, or in which there are dangling clauses or phrases. Wooley's Handbook of Composition should be a constant companion of the student, if need be, throughout the entire course in English.

Scott's **Practical Exercises in English** is the adopted text and should be completed during the year.

3. Composition. Short themes should be required at least once a week, and longer themes once or twice a month. These should be chiefly narrative and descriptive. Emphasis should be given to oral composition in order that students may learn to express themselves freely. An occasional drill in penmanship may be necessary.

Rhetorical instruction should deal systematically with the selection and arrangement of material and with such mechanical matters as headings, margins, paragraph indentions, and capitalization. Teachers need reminding that slipshod habits in their students with respect to these mechanical matters and in spelling must not be tolerated.

The **High School Word Book** should be used occasionally for drill purposes through the entire course, if need be, until the students attain a grade in spelling of 98 per cent.

Text: Hanson's **Two Year Course in English Composition**, or Scott & Denney's **Elementary English Composition**.—One unit credit.

Second Year—English (b).

1. For careful reading: "Julius Caesar" or "Merchant of Venice," "Silas Marner," "Vision of Sir Launfall," "Selections from the Old Testament," or Gray's "Elegy."

For outside reading, any three:

1. Stevenson—Treasure Island.
2. Kingsley—Westward Ho.

3. Kipling—Captain Courageous.
4. Cervantes—Don Quixote.
5. Dickens—David Copperfield.
6. Gayley—Classic Myths.

2. Grammar. Continue the drill work as occasion requires and make constant use of grammatical principles in both the readings and the exercises in composition.

3. Composition. Continue the short themes. Require long themes, some of an expository nature, at regular intervals. Careful attention should be given to paragraph structure and connection and to sentence structure and connection. The distinction between words which are often confounded with one another should be a subject of study. Special attention should be given to punctuation and to spelling, and good penmanship should also be required. Oral composition and practice for effective expression should not be neglected.

Text: Hanson's **Two Year Course in English Composition**, or Scott & Denney's **The New Composition—Rhetoric to Exposition**, page 300.—One unit credit.

Third Year—English (c).

1. For careful reading: "The Ancient Mariner," Burke's "Speech on Conciliation With America," "Macbeth" or "Henry V.," Dickens' "Tale of Two Cities," or Thackeray's "Henry Esmond."

Outside reading, any three:

1. Parkman—The Oregon Trail.
2. Kingsley—Hypatia.
3. Lytton—Last Days of Pompeii.
4. Dumas—The Three Musketeers.
5. Collins—The Mornstone.
6. Wallace—Ben Hur.

2. Grammar. The principles and facts of grammar studied heretofore should be illustrated and enforced whenever necessary. The technical study of grammar suggested for other years may be replaced largely by work done with dictionaries, books of synonyms, and with the language of the books studied.

3. Composition. The composition work of this year should be varied in subject matter and should give practice in nearly all the various kinds of writing—exposition, narration, description and argumentation. Upon the preparation of some of the themes considerable time should be spent. The pupils should constantly be encouraged to have opinions about the books which they read, and about the life which they live and see, and to take a pride in expressing their opinions correctly and effectively. It is presumed that no third year student will hand in a composition containing errors in spelling or flagrant mistakes in grammar.

Text—Herrick & Damon's **New Composition and Rhetoric**, or **New Composition—Rhetoric** by Scott & Denney, completed from page 300.—One unit credit.

Fourth Year—English Literature.

The course in English Literature is a course in reading literature, not in reading about literature. The adopted text, Long's **English Literature**, contains ample references for reading.

For supplemental purposes, Manly's **Selections From English Prose and From English Poetry** are recommended. One unit credit.

SUPPLEMENTARY READING.

In addition to the books required to be read and studied, students should be encouraged to read a large number of

supplementary books. These should be chiefly of poetry, fiction, biography and history. The purpose in urging students to do outside reading is to inculcate in them a taste for the best books, and to help them form the reading habit. The list given is merely suggestive and should be selected from and added to at the discretion of the teacher:

1. Aldrich—Story of a Bad Boy.
2. Austen—Pride and Prejudice.
3. Burroughs—Sharp Eyes.
4. Churchill—Crisis.
5. Curtis—Prue and I.
6. Dana—Two Years Before the Mast.
7. Defoe—Robinson Crusoe.
8. Dickens—Nicholas Nickleby; David Copperfield.
9. Dryden—Palamon and Arcite.
10. Eliot—Romola.
11. Emerson—Essay on Friendship; on Manners; on Conduct of Life.
12. Hale—The Man Without a Country.
13. Hawthorne—Wonder Book; Mardle Faun; Our Old Home.
14. Holmes—The Autocrat of the Breakfast Table.
15. Hughes—Tom Brown at Rugby.
16. Hugo—Les Misérables.
17. Irving—Legend of Sleepy Hollow; Rip Van Winkle.
18. John Brown—Rab and His Friends.
19. Kipling—Jungle Books.
20. Lamb—Tales From Shakespeare.
21. Macaulay—Lord Clive; Warren Hastings.
22. Riis—How the Other Half Lives.
23. Roosevelt—Ranch Life and Hunting the Trail.
24. Schurz—Abraham Lincoln.
- 25.—Scott—Kenilworth; Guy Mannering.
26. Shakespeare—Hamlet; Twelfth Night.
27. Stevenson—Kidnapped; Treasure Island.

28. Swift—The Voyages of Liliput.
- 29.—Thackeray—The Newcomes; Pendennis.
30. Thoreau—Walden.
31. Warner—Being a Bad Boy; My Summer in a Garden.

ORAL EXPRESSION.

The oral expression of literature is an essential part of the study of literature, and should be a feature of the teaching of English throughout the course. Composition should be oral as well as written. A considerable amount of oral expression should, therefore, be embodied in the regular required English courses. When in addition to this, a high school conducts a special class in Oral Expression, the following suggestions are offered:

The art which is sought in the study of Oral Expression is to get and to give to others the thought and feeling suggested by the printed page. In memorizing, the student should practice with this purpose in view. He should not study to learn the words of the text. In his striving for the true expression of the thought and feeling which they stand for, the words should find their place in his mind without special effort on his part. It is a false method to memorize printed lines as to form and sound, merely, and then to endeavor to tack on expression afterwards.

Helpful criticism should be given after the student has prepared the lesson, avoiding technical terms. Results should be sought as far as possible by means of questions, the answers of which are embodied in lines that are being rehearsed; for example, "What is that?" "What for?" "What do you mean?" Such questions skilfully directed should call forth all the meaning of the text, and thus stimulate in the most effective way the true expression.

During the year, in addition to the work suggested below, try to develop simple oral English by having the stu-

dent tell stories and experiences, and give elementary addresses without written preparation.

Texts: Hyde's *School Speaker and Reader* and Fulton & Trueblood's *Standard Selections*.

DEBATING.

This subject should be closely related to Current History. If desired, the two subjects may alternate and be continued throughout the year. Much of the subject-matter will be found in the leading magazines and in various reports. Systematic work in exposition, and argumentation must be required.

Suggested texts:

"The Making of Arguments," Gardner.

"Parliamentary Law," Gregg.

"Public Speaking," Clark.

Suitable magazines and reports.—One-half unit

MODERN LANGUAGES.

The plan is in conformity with the recommendations made in the report of the Committee of Twelve of the Modern Language Association of America, published by D. C. Heath & Co.

The first two years should be devoted to a thorough practice in the elements of the language, aiming at an accurate pronunciation, knowledge of the main principles of grammar, the acquisition of an idiomatic vocabulary, some facility in the spoken language, and ability to translate words of moderate difficulty.

Dictation exercises are recommended. At least half of the time in the class room should be devoted to grammar review, composition, and conversation. The same proportion of time may be profitably given to such a practice through the entire four-year course. During the third and fourth years some reading outside of class may be required.

Texts in French, Spanish and Greek were not adopted. The books named are merely suggestive.

FRENCH.

First Year.

Fraser & Squair's French Grammar, Part I. The exercises, if too long, could be halved. Francois' "Elementary French Prose Composition," about twelve lessons. Used after the Grammar, this book affords good practice in conversation and grammatical review. A graded reader, such as Aldrich & Foster's or Kuhn's may be used. In place of a reader, a collection of short stories may be of advantage, such as Williamson & Papot's "Easy French Stories," Meras & Stern's "Cinq Histoires," or Erckmann-Chatrian's "Contes Fantastiques." A short comedy, such as "La Poudre aux Yeux," "Le Voyage de M. Perrichon," "La Joie Fait Peur," or L'Ete de la Saint-Martin."

Second Year.

Francois' "Elementary French Prose Composition," the remainder. Michelet's "L'Histoire de France " "Extraits," or "Lamartine's Scenes de la Revolution Francaise." Daudet's "La Belle Nivernaise," or Sand's "La Mare au Diable." Dumas' "La Tulipe Noire," or Merimee's "Colomba." Augier's "Le Gendre de M. Poirier," or Pailleron's "Le Monde ou l'on s'ennuie."

Third Year.

Koren's "French Prose Composition," first half, and "French Daily Life," first half. Daudet's "La Petit Chose," or "Tartarin de Tarascon." Molier's "Le Bourgeois Gentilhomme." Hugo's "Les Miserables" or "Notre Dame de Paris," either abridged.

Fourth Year.

Koren's "French Prose Composition," the remainder, and "French Daily Life," the remainder. Dow & Skinner's

"Quelques Contes des Romanciers Naturalistes," or Balzac's "Cinq Scenes de la Comedie Humaine." Rostand's "Les Romanesques." Corneille's "La Cid," or Racine's "Andromaque" or "Athalie."

GERMAN.

First and Second Year.

Students electing German must complete at least two units of work to receive credit. Following are the texts adopted:

Spanhoofd's "Elementarbuch der Deutschen Sprache."

Bacon's "German Grammar."

Bacon's "Im Vaterland."

Manley's "Ein Sommer in Deutschland."

Barnes' "Wie Der Deutsche Spricht"—A German Reader.

Mueller & Wenkelbach's "Gluck Auf."

SUPPLEMENTARY:

Becker-Rhodes' "Elements of German."

If more than two units are offered, the adopted text may be supplemented by selections made from the books named below.

Third Year.

Fossler's "Practical German Conversation," and "German Daily Life," first half. Moser's "Der Bibliothekar," or Freytag's "Die Journalisten." Schiller's "Geschichte des Dreissigjaehrigen Krieges," or Freytag's "Aus dem Jahrhundert des Grossen Krieges," or Von Sybel's "Die Erhebung Europas Gegen Napoleon." Storm's "Der Schimmelreiter," or Hauff's "Lichtenstein," Freytag's "Soll and Haben," or Heine's "Die Harzreise."

Fourth Year.

Fossler's "Practical German Conversation," the remainder, and "German Daily Life," the remainder. Lessing's "Minna von Barnhelm." Schiller's "Maria Stuart" or "Wilhelm Tell." Goethe's "Hermann und Dorothea." Selections from Von Klenze's "Deutsche Gedichte."

SPANISH.

First Year.

Giese's "First Spanish Book," or Hills & Ford's "Spanish Grammar." Bransby's "Spanish Reader." Larra's "Partir a Tiempo."

Second Year.

Umphrey's "Spanish Prose Composition," first half, and "Spanish Daily Life," first half. Padre's Isla's "Gil Blas." Moratin's "El Si de las Ninas." Valeria's "El Pajaro Verde." Alarcon's "El Capitan Veneno."

Third Year.

Umphrey's "Spanish Prose Composition," the remainder, and "Spanish Daily Life," the remainder. Caballero's "La Familia de Alvareda." Valdes' "Jose." Galdos' "Marianela," or "Dona Perfecta."

Fourth Year.

Cervantes' "Don Quijote," selections. Selected dramas from Calderon and Lope de Vega.

ANCIENT LANGUAGES.

LATIN.

First Year.

The student should master a vocabulary of sufficient extent to enable him to begin the reading of Latin prose with some ease. The regular noun and verb forms and the chief elements of Latin syntax are taught thoroughly by constant practice in translation from Latin into English and from English into Latin.

Texts: Bennett's "First Year Latin," D'Ooge's "Latin for Beginners," Moulton's "Introductory Latin," or Gunnison & Harley's "First Year Latin" contains the material to be covered. Bennett's "Latin Grammar" or Burton's "Latin Grammar."

Second Year.

Students should read the first four books of "Caesar's Gallic War," or an equivalent amount of prose selected from "Caesar's Gallic and Civil Wars" or from Nepos' "Lives." "Second Year Latin," by Greenough, D'Ooge & Daniell, contains the necessary readings. "Caesar's Gallic War" by Gunnison & Harley is to be used. The Latin prose composition contained in the following book should also be covered: D'Ooge's "Latin Composition, to accompany 'Second Year Latin,'" D'Ooge's "Latin Prose Composition," Part I.

Third Year.

Students should read at least six orations of Cicero, including the four against Catiline. For the other two, we recommend the Manilian Law and Poet Archias.

The prose composition contained in D'Ooge's "Latin

Prose Composition," Part II, should be covered. "Cicero's Orations" by Gunnison and Harley.

Fourth Year.

The first six books of Virgil's Aeneid should be read with special attention to mythology and prosody.

GREEK.

First Year.

The fundamental principles of the language are carefully studied with special attention to writing the language with proper accentuation. The chief aims are to obtain a good working vocabulary and to be able to use that vocabulary correctly in the ordinary forms of Greek syntax. Gleason's "Greek Primer" contains the amount of ground to be covered.

Second Year.

Four books of Xenophon's Anabasis are used, accompanied with prose composition such as found in Pearson's "Greek Prose Composition," or an equivalent.

Third Year.

Six books of Homer's "Iliad" are read, with special attention to prosody and to the religion of the Greeks. Sight reading from the 23rd and 24th books.

HISTORY AND SOCIAL SCIENCE.

Mr. Claxton, the U. S. Commissioner of Education, said in a recent address: "If I should write a history of the world, I would divide it into two periods; one, ancient history; and the other, modern history; and the division line would be about the year 1800. And the things that have been accomplished in the world and the progress that has

been made within the last hundred years and a little more would balance all that had been accomplished before."

A new alignment in history is imperative. Instead of devoting so much time as is customary to the questionable facts of ancient history, a much larger proportion of time should be assigned to the more vital problems of modern and current history.

The two books (Robinson & Beard) which are to replace the Myer's texts should answer this demand. The first book deals with the essentials of ancient and medieval history—the fundamentals necessary to understand modern history—and carries the subject matter down to the year 1700. The second book gives ample attention to English history and relates it to the history of the rest of the world so much better than can be done where a separate text in English history is used that a separate text in this subject is undesirable. One unit of European history, including the essentials of Ancient history, and one unit of Modern history are therefore strongly recommended instead of the three-unit course frequently given.

These two units should be followed by one-half unit in American history and one-half unit in Civics or in Ethics of Citizenship if the latter subject has not been taken earlier. One-half unit or one unit in Economics should be given in the fourth year. Two courses in Economics are outlined; the one designated Rural Economics is preferable for the country high schools. In case but one-half unit in Economics is offered, the half-unit in Civics may be given in the fourth year.

At the request of a number of high school teachers, one-half unit in Current history (and Debating) is outlined. A half-unit in Sociology is also provided for the few schools prepared to offer this subject.

EUROPEAN (INCLUDING ANCIENT) HISTORY.

Much of the time in class should be utilized in considering the essentials of history and but slight attention should be given to minor events and characters. The chief interest should center around the great world movements that made the past significant and the present possible. In other words, the pre-eminent topic is the growth of civilization, and the chief concern the development of ability to interpret its problems and tendencies.

Outside of class, however, much supplemental reading should be suggested, some of this should be definitely assigned and carefully checked, but much of it might be optional. It should not be difficult to get students of high school age to read a great deal of historical matter at home. The teacher who lives up to his high privilege of awakening a love for history in his students will not be troubled through inadequate preparation on the part of his class.

Ancient (and Oriental) History.

1. The topics on Ancient history should be preceded by a general review of geography. Grand divisions; distribution of land and water areas; climatic zones; life under different conditions; present location of the races; special study of the geography of Mediterranean countries and of the Tigro-Euphrates valley.

2. Consideration of the three groups of people lying between the Nile and the Tigro-Euphrates valleys, viz.: the Nile group with Egypt as a center, the Tigro-Euphrates group, embracing chiefly Chaldea, Babylonia and Assyria, and the intermediate group composed largely of the Hebrew and the Phoenician people. The characteristics of each group was largely determined by geographical position and conditions. What problems confronted each group and how did they attempt to solve them? What beliefs

had they that are significant to us? What contributions did they make to civilization?

3. The people of Lydia and Persia although located in Asia-Minor resembled the Greeks in character and institutions. Their history with that of the Phoenicians forms a connecting link between Oriental and European history. Persian history parallels Greek history for several centuries, the same is true of Phoenician, and Greek and Roman history. How did the people of Lydia and Persia differ from those already studied? What new problems did they encounter? What contributions did they make?

4. Essentials in Greek History:

(a) Geography of Greece—A peninsula broken up by inlets of the sea into numerous smaller peninsulas and islands; topography, climate. All Greece faces Asia-Minor and has no direct connection with Italy. The characteristics of the people and much of their national growth may be seen to follow naturally from their isolated position, broken coast line and other geographical features.

(b) Democratic spirit of the Greeks—Illustrate by such a story as Pericles or Cleon standing before the Assembly of Free Athenians, endeavoring to persuade them to some course of action. Contrast with this the Spartan public tables and the Spartan idea that all the people belonged to the State; that the children from the cradle up must be trained as citizens of Sparta. Athens aimed to develop men, Sparta to produce soldiers.

(c) The artistic spirit of the Athenians—They were great builders and artists. They loved music and poetry. Contrast this with the contempt the Spartans had for all who did not live the strenuous life. Here is a fine subject for a high school debate.

(d) Greek training—Beginning early with the pedagogues; later gathering at the feet of some famous philos-

opher. The great national games; the immense gatherings in the open air; theatres in which to listen to plays and poems—all of the most intense interest if illustrated with pictures, and if real scenes from the lives of Socrates, Aristophanes and others are read or told to the class. Contrast with the simple life of Sparta.

(e) The high ideals of the Greeks—Every member of the class should be able to tell the story of Thermoplae, of Marathon, of the Ten Thousand. Every one should know the best of the myths. The whole class should practice on rendering the tales of the Golden Fleece, Hercules and the Old Hero Stories. Greek myths and hero tales have been an inexhaustible source of inspiration for all later peoples.

(f) Greek colonization—They spread westward, founding Syracuse and Marseilles; northward, about the Euxine; eastward, peopling the islands of the Aegean and into Asia Minor. Be sure that the student realizes what it meant to have Greek culture and ideals thus spread by these colonizations; especially make Alexander the Great stand out, not simply as a warrior, but as a founder of cities, a father of commerce and a disseminator of Greek culture. Note the distinction between Hellenic and Hellenistic.

5. Essentials in Roman History:

(a) The geography—Contrast it with the geography of Greece.

(b) The Romans were conquerors—They were the chief medium through which Grecian culture was extended far and wide. We inherit Greek art, music, drama, ideals through the Romans; and it became possible for us to inherit these because the Romans were conquerors. Their wars then must be studied but always with the great aim in mind—how did this new conquest extend the influence of civilization? Two great men stand out prominently—Caesar the Roman and Hannibal the Carthaginian. The

story of the latter will best bring out the most noble characteristics of the Romans.

(c) Their intense patriotism—History doesn't furnish a finer picture than the Roman Senate sitting in state waiting the invader at the gates of Rome after he had slaughtered two great armies unless it is the picture of the Roman people pouring out their blood ungrudgingly through seventeen years to save their country from the terrible Carthaginian.

(d) Rome and Christianity—Rome prepared the way for Christianity. Without the preparation made by the Roman conquests the disciples of Jesus could not have covered the world so quickly or so completely.

(e) Roman Law—Our greatest inheritance direct from the Romans was legal. The great body of laws handed down from them has furnished the ground-work for all modern legal systems.

EUROPEAN HISTORY.

6. The Teutonic Migrations:

It is not important that the student know about the separate movements, but he should carry always a clear-cut picture of the immensity of the upheaval as a whole. He should see also that it was not sudden; that it was so slow as to give time for the Teutonic hordes to absorb much of the civilization of Rome before they overwhelmed that civilization. He should note also where they finally came to rest, in terms of our modern national boundaries.

7. The English:

Alfred the Great and his people the Anglos and Saxons should stand out; a clear picture of his struggles with the Vikings should persist in the student's mind. William of Normandy is the next great figure. After his day the English people were no longer as they were in Alfred's time.

Such books as *Ivanhoe* are invaluable for home reading during this period. *Hereward* is also excellent. The next great figure is Richard First, *Cœur de Lion*—not that he was a great King, but that he was a great Crusader and typifies best the knight-errant of that day. About him, Godfrey de Bouillon and Frederick Barbarossa can be grouped a series of pictures that will make the Crusades an unending source of contemplation for the student. Here best can be taught knighthood and all that the word implies; chivalry with its many beautiful ideals, and feudalism.

8. The Beginnings of Democracy:

The student should sense clearly that the people ruled in Athens and for a time in Rome; that privilege made slaves of them during the Roman Empire, but that almost pure democracy existed among the Teutonic hordes that swept over the better part of the Empire. Feudalism created baron and serf and this condition grew steadily worse on the Continent up to the time of the French Revolution, but in England the barons themselves arose in King John's day and wrested from him *Magna Charta*, the Great Charter of Liberties of the English people. This was the real beginning of democracy. The live teacher will make that scene in Runnymede with King John on one hand and Simon de Montfort speaking for the English people on the other, a living memory.

9. Life During the Middle Ages:

Be sure that the students have a clear conception of:

(a) The towns—Generally walled; frequently free states; many of them bound in the Hanseatic League; commanding their own army and fleet; ruled by their guilds; jealous of their privileges; frequently sacked by the armies of knights, or even by those of the King within whose territories they were situated.

(b) The nobles—Enthroned in their castles; frequently living by robbery; generally at war with each other and

often with the King; holding land and owning allegiance sometimes to several different sovereigns; point out here how such conditions made it impossible to build up a real national life. Show that the feudal system made the noble dependent on the peasant for military services and the peasant on the noble for protection.

(c) The villeins—Generally dwelling in villages; holding land of the noble; owing him service; rooted to the soil.

(d) The church—Get pictures of cathedrals and monasteries. Be sure to make clear that many of the high dignitaries of the church held land under feudal tenure like nobles and owed allegiance to the King for this land. Here is the place for the Canterbury Pilgrims.

(e) Commerce—The lack of national laws and protection for highways; the robber barons; the tolls and taxes exacted by the various little estates made commerce most precarious; hence the Hansiatic League for the rise of great commercial cities like Venice and Genoa. The Crusades, increasing knowledge of the East and introducing eastern luxuries to Europe, gave a great impetus to commerce, and to discovery. A good teacher will be sure to leave in the student's mind the idea that America was discovered because of the necessities of medieval commerce.

10. Rivalry for the New World:

The essential ideas are Spain predominates and through Cortez and Pizarro gains great riches; English sea dogs in the time of Elizabeth sweep the seas; Drake should be well known to the whole class. Note especially that religious antagonism between the nations emphasizes national hatred and love of gain. This same religious antagonism lies at the bottom of the revolt of the Dutch. The Netherlands were Protestant. They rebelled against the exactions of Catholic Spain. England was Protestant and this chiefly led her to fight with the Dutch. Every student should know the story of the Perfect Gentleman, Sir Phillip Sidney, and

of the great fiasco, the Spanish Armada. The wars of this period were generally religious wars. Emphasize this with a story of the Thirty Years' War in Germany. Gustavus Adolphus should linger in every student's mind as should also Wallenstein and Tilly. The horrors of medieval warfare can best be painted here.

11. When the Protestants Disagreed:

But English America was colonized chiefly because the Protestants of England fell out among themselves. This is the key note of the early part of the 17th century. Charles' quarrel with Parliament over taxes; John Hampton and the ship money; Cromwell and the Puritans are the big things here. In the early part of the struggles the Puritans flee to New England. After the King is killed the Cavaliers seek Virginia. The repressive laws due to Puritan triumph, the Five Mile Act and the Conventicle Act are worthy of note because they drove dissenters to America. In the same way France was driving many of her best citizens to America—1 unit credit.

MODERN HISTORY.

Robinson and Beard's Outlines of Modern History gives the essentials and makes prominent the movements that are important to the modern student. The text may be followed somewhat closely. It should be supplemented freely; and the suggestions heretofore given should be observed. No elaborate outline seems necessary.—1 unit credit.

AMERICAN HISTORY.

The text adopted (Muzzey) appears to emphasize the essentials and should be followed. The teacher will supplement the text fully as he may desire. Care should be taken to show that the industrial pursuits of a people create their

social and political conditions. All previous work done in this course should find in American History its fruition and consummation. The teacher should not forget that he is teaching American boys and girls and that the one great purpose to be achieved is to develop true ideals of citizenship together with a desire to realize these ideals in the lives of students.—One-half unit credit.

CURRENT HISTORY.

A half year in Current History is indispensable to the rounding out of the course in history. Students should be intensely conscious of the great modern-day problems, and should acquire judgment and discrimination in their interpretation. Moreover, such interest in history-in-the-making should be developed that students after leaving school will continue their historical studies.

Among the problems of vital interest today are the following:

1. Conservation of national resources. (a) Alaska—is it being throttled?

2. Imperialism. (a) Should we keep the Philippines? (b) Should we intervene in Mexico? (c) Should tolls be charged foreign vessels passing through the Panama canal?

3. National Monopolies. (a) Government ownership vs. regulation.

4. Political reforms.

5. Economic reforms.

6. Social reforms.

Suggest texts: Review of Reviews, The World's Work, Atlantic Monthly and The Outlook.

References: Trust Problems & Trades Unionism. British Social Problems. Current Literature. Harper's Weekly. Literary Digest. North American Review. Popular Science Monthly.

The school should subscribe for "The Readers Guide to Periodical Literature," by H. H. Wilson Co., Inn, Minn. —One-half unit.

ETHICS OF CITIZENSHIP.

This is essentially the outline given by Prof. Bennion to the secondary training students of the University. Teachers should not follow it too closely, but should aim to adapt the work to local needs and to problems as they arise. Definite readings are assigned, followed by class discussion of each topic, each student is then required to write a brief paper on the subject treated. Students are thus trained to make ethical judgments about matters with which they are somewhat familiar. The aim throughout is practical and the results should be seen in improved conduct on the part of the students, in increased ability to govern themselves, and in enlarged ideals of social and civic life.

Outline:

A. Discussion of the origin, nature and purpose of the school in which the course is given.

1. The students as members of the high school.
2. The high school as a member of a school system, and the school system as a community of educational institutions.
3. The dual function of schools—developing the powers of individuals and transmitting race inheritance; two aspects of one process.

B. A study of race inheritance.

1. Civilization begins in the acquisition of knowledge and skill that can be transmitted from one generation to another; e. g., knowledge of and skill in making and using tools.
2. Classification of the race inheritance.
 - a. Material or Economic, having to do primarily with

material well being—knowledge of all sorts of industries and appliances used in industries.

b. Scientific, pure science and applied science; the major portion of the latter belongs also under (a).

c. Literary, including languages and all the uses to which languages are put. Much of this is essential to (a) and (b).

d. Political, with emphasis upon ideas of political and civil rights; e. g., the bill of rights in Federal and State constitutions.

e. Institutional: the family, the church, the state—including school systems discussed under A. The function of institutions is education in the broadest sense. They are necessary to conserve and develop everything under (a), (b), and (c), (d).

C. The Solidarity of the Race, an aspect of the interdependence of all things.

Philosophers generally agree that some sort of unity pervades the universe. The dependence, directly or indirectly, of the organic upon the inorganic world, and of man upon other organisms, is at once evident. With the race of civilized men this mutual interdependence become tremendously magnified. It includes not only economic and social interdependence in the present, but a dependence of the present upon all the past; it makes each generation a recipient of the race inheritance, and a means of transmitting this race inheritance to future generations.

D. The use of the natural resources of the earth.

The earth with all its resources is for the support and the development of the race. Governments hold or control these resources, theoretically, for the good of all the people, allowing individual citizens to acquire title to a portion of these resources, or to certain kinds of resources, under such regulations as seem equitable. The regulation of

the use of all natural resources for the best good of present and future generations is one of the functions of the state.

The ethical-economic basis of democracy.

E. Application of the above principles to current economic-political problems.

1. Conservation of natural resources.
2. Ownership or regulation of public utilities.
3. The ethical basis of private property.

A man claims that his which he has created, or which he has purchased with results of his labor—directly or indirectly. Besides this he claims a share of the natural resources of the earth, which may or may not be held in common.

4. The inheritance tax. Income tax.

5. Financial support of public education—its basis and limitations.

F. Application of the above principles to the moral life of the individual.

1. The duty of the individual. (a) To acquire what he can best use of the race inheritance, (b) to develop his own resources, and (c) to use all his abilities and resources for the good of mankind—the ideal of social service based upon the ideas of race solidarity and the larger justice. The larger justice requires of the individual that, for what he has received, he shall return to the race to the extent of his ability. Each is the beneficiary of the labors of millions, and the labor of each may yet benefit millions. Thus is good multiplied.

2. The development and expression of personality in institutional life.

a. In the family. The family as an economic unit, ethically considered. The ethical influence of children in the home.

- b. In business organizations.
- c. In religious and charitable institutions. Need of co-operation in social betterment.
- d. In civic life—local, state and national.

Bibliography for Course in Ethics of Citizenship:

The Strength of Being Clean, Jordan.
The Higher Sacrifice, Jordan.
Self Measurement, Hyde.
A Study of Greatness in Men, Larned.
The Primer of Right and Wrong, Larned.
The Philosophy of Loyalty, Royce.
American Citizenship, Brewer.
The Citizen's Part in Government, Root.
Four Aspects of Civic Duty, Taft.
The Citizen in His Relation to the Industrial Situation, Potter.
Freedom and Responsibility, Hadley.
Standards of Public Morality, Hadley.
Up From Slavery, B. T. Washington.
Story of My Life, Hellen Keller.
Work and Habits, A. J. Beveridge.
Home Training Bulletins, Wm. A. McKeever, Manhattan, Kansas.

An article in the School Review of April 1912, entitled "A Course in Moral Education for the High School," will be very helpful in this course. The School Review is published by the University of Chicago Press.

CIVIL GOVERNMENT.

Text, "Government and Politics in the United States," by William B. Gitteau.

This course comprises a careful analysis of government and its functions, from rural local affairs to the involved and intricate machinery of the National Govern-

ment. The study of civil government is usually theoretical and uninteresting; this is probably because the work is not supplemented by the consideration of the concrete and vital problems that confront humanity in this age. In other words the lessons in civics have not been applied. To effect this application, Guitteau suggests the use of such material as town warrants, legislative bills, sample ballots, presidential messages, and the like. Appendix "D" gives a detailed list of material for this purpose. The author also advises that "Members of the class should be encouraged to visit township, county and municipal offices: and local officials should be invited to come before the class and describe the business of their departments." Other valuable hints are given in the preface.—Credit, one-half unit.

RURAL ECONOMICS.

Text suggested: "Carver's Rural Economics."

In its general treatment this course is much more simple than Economics proper, and yet it is logically adapted to the senior year. In high schools where the problems of life are essentially rural in their nature this work will prove to be more interesting and more profitable than the heavier course. This fact might well form the basis of a choice between these two courses. In large and well developed country high schools this work may be followed profitably by the other course. There seems to be no good reason, however, for giving this work in the city high school, since it is particularly agricultural in its nature.—Credit, one-half unit.

ECONOMICS.

Text: "The Elements of Economics," by Bullock.

This course, pursuing the indicated text, should cover in a general way the field of economic science. While the subject as Bullock treats it is in no wise simple, it is yet not

too difficult for careful and detailed study by high school students. It should be reserved, however, for the senior year. The course is inclined to be academic in its nature, in which regard it is essentially different from the course in Rural Economics.—Credit, one-half unit.

SOCIOLOGY.

An elementary course dealing with the more vital aspects of the subject as related to local and national conditions.

Text: Ellwood's "Sociology and Modern Sociological Problems."—One-half unit.

SCIENCE.

General Science.

The purpose of this course is to secure such a knowledge of natural laws and phenomena that the student will desire to know more about them and their practical application to every-day life. To pursue successfully any branch of science the student must be trained along lines of right thinking; he must have a quickened power to observe intelligently, and lastly he must have a vital interest in the physical and biological manifestations of nature. This power comes from a scientific study of the common things about us. The work is carried on by means of a series of experiments which are intended to bring out and emphasize the fundamental principles of science. No text is recommended, but students are required to read and report certain definite assignments made from various books. They are required also to write up each experiment naming the apparatus, the object, the method and the conclusion—One-half unit credit.

AGRICULTURE.

The work in Agriculture should be very definitely correlated with the agricultural activities of each neighborhood, if, for example, sugar beet growing is the leading ag-

ricultural pursuit, special attention should be paid to the sugar beet in the study of Crops, and again the requirement of sugar beets should be emphasized in the study of Soils. If, on the other hand, dry-farming is the leading industry of the community, more time should be spent on the study of wheats and other dry-farm crops, and the handling of dry-farm soils would be emphasized in the study of the soil.

The arrangement and length of courses should also be related to the needs of the community. In a fruit growing community, the full year might be given to fruit-growing; or at least to fruit-growing and vegetable gardens; while in a stock-raising community the course in Animal Husbandry should be extended to cover a year.

Elementary Agriculture.

This course is designed to be a brief introduction to the various agricultural subjects. The first half of the course should be devoted to the general laws of plant production, and the second half to the laws of animal production. As far as possible the crops grown in the neighborhood should be used in illustrating the principles under discussion. It should be the first course in agriculture given.—One-half or one unit.

Text: "Elementary Principles of Agriculture," by Lewis and Ferguson.

Agronomy.

Soils. A general course covering the important questions relating to soils. A discussion of the origin, composition and properties of soils with methods of handling to produce high yields of crops and at the same time maintain the fertility. Special attention should be given to the water relations of the soil—One-half unit.

Suggested text: "Soils and Soil Fertility," A. R. Whitson and H. L. Walster.

Field Crops. A general course treating the most common western field crops, their origin, distribution, methods of seeding, treatment during growth, etc. The cereals, legumes, root crops, and grasses are to be discussed.—One-half unit.

Suggested text: "Field Crops," Wilson & Warburton.

Suggested books: Hunt's "Cereals in America;" Voorhees' "Forage Crops;" Fraser's "The Potato."

These courses may be combined where there is only limited time for work in agriculture.

In order to assist the teacher and the class to make a certain amount of the work as definite as possible and to prevent a scattering of energy over an unrelated field of subject matter, the following procedure is suggested:

In order to determine the relative importance of subject matter to the students, the class through observation and personal investigation, should discover answers to these questions:

1. What important field crops, fruits, or vegetables are produced in the neighborhood?
2. Which of these is most important and why?
3. The product. (a) What acreage, (b) Number of people employed, (c) Value?

If, for example, wheat is found to be the product that this investigation suggests for study, then the order of procedure should be as follows:

The adopted texts and other supplementary material should be used for the purpose of directing the work and finding answers to questions and problems.

Students should keep a careful record of their investigations, particularly of all experiments.

The text should rarely be followed page by page.

1. Study of individual plant with sample in hand.
2. Varieties to which sample belongs.
 - (a) Kinds of wheat.
3. Importance of wheat as a world crop.
 - (a) Importance of wheat in U. S.
 - (b) Importance of crops in Utah.
4. Soils of locality adapted to wheat.
 - (a) Type of soil necessary.
 1. Dry Farm Soils.
 - (a) Characteristics.
 - (b) Alkaline or acid.
 2. Irrigated Soils.
 - (a) Characteristics.
 - (b) Alkaline or acid.
 - (b) Preparation of Soil.
 1. Methods employed in locality.
 2. Methods employed generally.
 3. Purpose of tillage.
 - (c) Fertilizers.
 1. Barnyard manures.
 2. Green manures.
 3. Commercial fertilizers.
5. Sowing, harvesting, threshing.
 - (a) Methods employed.
 - (b) Machinery
6. Selection of seed wheat.
 - (a) Why select from field and not from bin?
 - (b) Testing seed for vigor of germination.
 - (c) Examination of freedom from contamination.
 - (d) Treatment of contaminated seed.
7. Relation of wheat to crop rotation.
 - (a) Wheat as a primary crop.

- (b) Wheat as a cover crop.
- (c) Wheat in its relation to animal husbandry.
- 8. Enemies of wheat.
 - (a) Insects.
 - (b) Fungus diseases.
- 9. Marketing.
 - (a) Local markets.
 - (b) World markets.
- 10. Grades of wheat.
 - (a) How determined.
 - (b) Standards used.
 - (c) **Score cards.**
- 11. Cost of production.
 - (a) Gross returns per acre.
 - (b) Net returns per acre.
- 12. Food Products.

Substitute any other product for wheat and, with slight modifications that easily suggest themselves, the above outline may be followed. Through centering effort on one or two types as indicated, the energies of the class will be conserved instead of dissipated, a definite problem will be constantly before them, and a true method of investigation will be suggested. Furthermore, it may be seen, that in the treatment of any type of field crop, practically all the important principles of plant growth will be encountered.

While the above outline is designed as a half-unit course, a full unit may well be devoted to its consideration.

Texts: "Field Crops," by Wilson & Warburton; "Dry Farming," by Widtsoe; "Fruit Growing in Arid Regions," by Paddock & Whipple.

Supplementary texts, especially on soils, and suitable agricultural bulletins must be available.

Horticulture.

Fruit Growing. This course is intended to give the student a scientific and practical knowledge of commercial fruit growing and the production of fruit for home use, taking up such features as selection of orchard site, planting, culture, harvesting and marketing of the crop.—One-half unit.

Text book: "Fruit Growing in Arid Regions," by Paddock & Whipple, published by the Macmillan Company.

Vegetable Gardening. This course deals with the cultivation of various vegetable crops, with a consideration of soils, fertilizers, planting, transplanting, harvesting, and storing of vegetables for commercial and home use.—One-half unit. Desirable text book is "Principles of Vegetable Growing," by Bailey.

These courses may be combined in districts where horticulture is not of first importance.

Animal Husbandry.

General Animal Husbandry. This is designed to give the student a general insight into the whole field of Animal Husbandry, showing its relation to Agriculture as a whole. The various breeds of livestock are considered in a general way and their adaptability to different kinds of livestock farming is noted.

The importance of type in livestock is considered and some practical work in scoring animals is given, as well as practice in comparative judging of the different types of animals. Points in general care and management of livestock are also discussed.—One-half unit.

Suggested text: "Beginnings in Animal Husbandry," Plumb (Webb Publishing Co.)

Dairying. This course is designed to give the student a general insight into some of the fundamental principles of milk production and manufacture of milk products. Sanitary milk production and market milk will also be considered. The value and method of keeping records on cows will be made a part of this course.

Laboratory work will consist of testing milk, milk separation, and record keeping.—One-half unit.

Suggested texts: King's "Milk and its Products," revised edition: "Dairy Cattle and Milk Production," by Eckles.

Only selected chapters of these books can be used.

The following books and bulletins must be available:

Beginnings in Animal Husbandry, Plumb.

Types and Breeds of Farm Animals, Plumb.

Utah Agricultural College Bulletins.

The supplementary texts adopted.

Dairy Cattle and Milk Production, Eckles.

Sheep Management, Kleinheinz.

Swine, Deitrich.

Animal Industry.

For the purpose of determining the relative value to them of the various phases of animal industry, the class through personal investigation should discover answers to the following:

1. (1) Who are engaged in breeding pure breed stock in your neighborhood?

(2) Who are engaged in grazing and feeding stock?

(3) Who are engaged in both breeding and grazing and feeding stock?

2. Which of the two is more important and why?

3. (1) State the number and size of the herds.
- (2) The number of people employed.
- (3) The value of the product.

If it is found that beef cattle is the subject that is naturally suggested for consideration, then the order of procedure should be as follows:

Arrange frequent visits for the purpose of studying the animals at first hand.

Use the texts and supplemental books and bulletins to find answers to the questions and problems as they arise, but not to follow page by page.

Students should keep a careful record of their investigations.

1. Types of cattle.
2. Breeds of beef and semi-beef types.
 - (a) Breeds in your locality.
 - (b) Purpose of the breeds.
3. Importance of the beef industry in the world.
 - (a) Importance in the United States.
 - (b) Importance in Utah.
4. History of the development of the
 - (a) Breeds represented in your locality.
 - (b) Original breeds.
5. Study of an individual of the beef type. (Specimen before the student).
 1. (a) Head, (b) neck, (c) forequarters, (d) body, (e) hind quarters.
 2. General conformation of animal. (a) Proportion of length to height, (b) proportion of the three dimensions of body to fore and to hind quarters, (c) symmetry and smoothness.
 3. Quality of (a) bone, (b) hair, (c) skin.

4. Color and markings.
6. The ideal of the breed represented by the individual studied.
 1. (a) Head, (b) neck, (c) forequarters, (d) body, (e) hind quarters.
 2. General conformation of ideal. (a) Proportion of parts as above.
 3. Quality of (a) bone, (b) hair, (c) skin.
 4. Color and markings.
 5. Trueness of the individual studied to ideal of breed to which he belongs.
7. Use of score card.
8. Breeding.
 - (1) Selecting the sire.
 - (2) Selecting the dam.
 - (3) Individuality and family record.
 - (4) The offspring.
 - (5) Relative value of pure breeds.
 - (6) Relative value of grades.
9. Grazing and feeding.
 - (1) (a) Methods, (b) seasons, (c) feeds used.
10. Relation of beef cattle to field crops.
 - (1) (a) Balanced farming, (b) feeding green crops, (c) feeding mature crops, (d) silo, (e) the balanced ration.
11. Diseases and parasites.
12. Marketing.
 - (1) (a) Local, (b) central, (c) foreign.
13. Grades of beef.
 - (1) How determined.
 - (2) Standards.
14. Cost of production.
 - (1) Gross returns per animal.
 - (2) Net returns per animal.

15. Products.

- (1) Meats.
- (2) Leathers.
- (3) By-products.
- (4) Fertilizers.

This outline suitably modified may be followed in studying other animals. In the study of sheep, wool and its products will be a special subject of study, in dairying, milk and its products will need careful attention, and in poultry, housing and egg production.

Physical Geography.

In this beginning course in science an appreciation of the scientific method and spirit should be developed. Due attention should be given to field work. The student should be taught to see things accurately and should be required to record carefully some of the results of his observations. Our own state furnishes unexcelled facilities for the study of physiography. Usually within reach of the school house are several physiographic types or units. These should be carefully observed and studied and should form a basis for the study of subject-matter in the text. The following topics should receive special attention: Meteorological conditions of Utah; the rocks and soils of the locality and the State; the Wasatch, the Uintah and the Henry mountains; the Great Basin, its ranges, deserts, volcanic features and ancient lakes; Great Salt Lake; the Colorado Plateau and Grand Canyon. Text: Fairbank's "Practical Physi-Grand Canyon. Text: Fairbank's "Practical Physiography." —One-half unit credit.

Zoology.

From half to three-fifths of the periods allotted to this subject should be devoted to laboratory work. Each laboratory period should be not shorter than an hour and a half,

i. e., equivalent to two ordinary recitation periods. It is desirable that the subject should be approached from the natural history standpoint. To this end, it is recommended that the course be introduced through studies on the insects and their allies, since these animals, which in species outnumber those of all other groups together, lend themselves admirably to the illustration of such topics as metamorphosis, protective resemblance, mimicry, parasitism, commensalism and social life. Principles of classification and scientific nomenclature may be taught here as illustrated, e. g., by the locust and its relatives. Ample field work should be done as part of this study. After completion of the work upon the orthoptera, the other types and groups may be taken up in regular sequence. In the laboratory students should be trained to observe closely and to make the most of each specimen studied, as the acquisition of the habit of correct and thoughtful observation and of a definite knowledge concerning a limited number of animals is better than the learning of mere classification and a merely superficial knowledge of a large number of forms. The careful and orderly recording of work by means of drawings and notes, particularly the former, should receive special attention. The room for work in zoology should be well lighted. It should be provided with convenient tables at which the student may work; with a water supply and receptacles for waste material and places for the storage of apparatus, both that for general departmental use and that for the individual use of students. Aquaria for the keeping of living material should be arranged for. Students may be required to provide themselves with hand magnifiers, small scissors, forceps and scalpels, which need cost but little; or these may be provided by the school, when use could be made of a better type of dissecting microscope. One compound microscope for each two students in a section is desirable, but not indispensable. At the outset there should be, however, at least one good compound microscope, with

slides and cover-glasses. There should be kept on hand a few ordinary reagents, such as chloroform, alcohol, formalin, turpentine or xylene, Canada balsam, glycerine, ammonia, hydrochloric acid and a few stains.

Linville and Kelly's "Text Book of Zoology," is the text. "The Guide for Laboratory and Field Work," by the same authors gives outlines for laboratory and field work, detailed instructions and suggestions to teachers, and a list of reference books and articles dealing with the several groups and topics.—One unit credit.

Botany.

The time devoted to this course should be in amount and arrangement the same as for zoology. The course should give a general view of the entire subject. More attention than has been usual should be given to ecologic relations. In addition to the fundamental conceptions of ecology, a good idea of comparative morphology and life histories and of the more important phases of physiology should be aimed at in the course. In anatomy and morphology, the following topics should be considered, probably best in the order indicated: The seed, the food supply, experimental determination of its nature and value; generation and growth of embryo; the shoot; gross anatomy, and relations of leaf and stem buds; structure of shoot, annual growth; the root; the flower, structure and function of parts, with study of important types; the fruit, with study of types; the cell and formation of tissues. In plant physiology these topics should be considered: Water in the plant, including osmosis, transfer, transpiration, plasmolysis, turgidity; photosynthesis; respiration; digestion; irritability (geotropism, phototropism, etc.); growth; fertilization. The following ecological subjects should be carefully treated: Dissemination; cross-pollination; light-relations; plant societies; plant associations and geographical distribution. The following are selected as types to be studied in the laboratory. Others

named in the guide indicated below may be included when time permits: Pleurococcus or similar form, Spirogyra, Fucus, Nematium, Bacteria, yeast, a rust (Puccinia), mushroom, lichen, liverwort (Marchantia), moss (Minimum or Funaria), fern, Equisetum, Lycopodium and Selaginella, pine, monocotyledon, and dicotyledon studied in comparison with the preceding. In addition, forms representing the principal divisions of Angiosperms should be studied and considerable time devoted to forming an acquaintance with the local flora.

As indicated under zoology, a special laboratory for biological work is a necessity. A supply of glassware for the simple physiological work required, in addition to the equipment needed for zoology, must be provided.

Texts: Bergen and Caldwell's "Practical Botany," and Andrew's "Practical Course in Botany."—One unit credit.

Physiology.

The work of this course should be based as far as possible upon practical laboratory exercises and emphasis should be placed upon the important physiological principles and processes rather than upon details of anatomy. Special attention should be given to the thorough treatment of the fundamental processes of nutrition, including such phases as digestion, circulation, respiration, assimilation, dissimilation and excretion, the co-ordination between which should be clearly brought out. In the consideration of foods the student should become familiar with the more important nutrients, and the tests for their detection. The uses of foods, methods of cooking, and food economy should be thoroughly treated. As a basis for work in hygiene, the general principles of bacteriology should be presented and discussed in considerable detail. Practical laboratory work in this line should be emphasized. In class such topics as the following should be dealt with: Nature of infectious diseases, isolation, principles and methods of disinfection,

inoculation and vaccination, general sanitary regulations, pure foods.

Of the apparatus and equipment required for the course in Physiology, much will be identical with that for Zoology and some with that used in Physics and Chemistry. Text: Walter's "Physiology and Hygiene."—One half or one unit credit.

Zoology—Physiology.

For teachers competent to treat the subject in that way, it is suggested that Zoology and Physiology be combined in a unit course. The student can be led to understand the most important physiological processes through the first or zoological part of the work. Application of these facts to Human Physiology can then be made with a minimum of time and a maximum of result in understanding. Some chapters in Kellogg's "The Animals and Man" are well adapted to this method, as is also the latter part of Hunter's "Essentials of Biology."

Physics.

A satisfactory course in high school Physics should consist of daily class-room and weekly laboratory work throughout the year, the laboratory period being three hours once a week, or two hours twice a week.

The class-room work should consist of lecture-table demonstrations and experiments by the teacher and recitations by the students. The laboratory work should be chiefly quantitative in character. The students may work in pairs in the laboratory, but each student should keep a neatly written record of this work. This record should be written with ink in the laboratory, under the teacher's immediate supervision, and should consist of a statement of the experiment to be done, a statement of the principles and theory involved, a description of the apparatus and method

used, a tabulation of all observations, data, and computed results, and finally a discussion of the results and what they show. Drawings and sketches of apparatus greatly aid in description.

A satisfactory pursuit of this subject requires a good modern text book and at least three hundred dollars' worth of apparatus, judiciously selected. If apparatus and laboratory facilities can not be provided, physics should not be taught. The laboratory facilities for good work with a class of a dozen or fifteen need not be expensive, three hundred dollars being enough to make a good start in both classroom and laboratory apparatus.

Text: Millikan and Gale's "First Course in Physics and Laboratory Course." Merrill's "Laboratory Manual."—One unit credit.

Chemistry.

For this subject we suggest two laboratory periods of two hours each, preferably consecutive, two recitation periods and one lecture or demonstration. The experiments suitable for the latter will be found in the Teachers' Handbook accompanying the text. For valuable suggestions regarding the laboratory equipment and the best methods of teaching the subject, consult Smith and Hall's "Teaching of Chemistry and Physics in Secondary Schools."

The cost of laboratory equipment, including desks for a class of ten students, would be from 50 to \$100. The chemicals required at the outset would cost \$50. After the first year the annual cost should not exceed \$25. In addition to the above, each student would require apparatus that would cost about \$7.50.

Text: Brownlee's "First Principles of Chemistry and Laboratory Manual."—One unit credit.

Astronomy.

Students should be referred directly to the objects of the sky in order to stimulate interest before spending much time on technical details; that is, the course should be observational rather than technical. In the study of the subjects, more of thinking than of memorizing should be required, and the physical, rather than the mathematical aspects of the science should, perhaps, be emphasized. If presented in this way, it will be found that astronomy is not a series of isolated and imperfectly connected facts, but an interesting sequence of events, and that the fundamental principles of the science are connected with tangible and familiar objects as is the case in chemistry and physics.

A course in astronomy of great educational value can be given in the high school with little formal mathematics beyond a good knowledge of elementary algebra and geometry.

It is very desirable to have a reference library of a few well chosen works on astronomy, and a small telescope costing about \$150 to \$200.—One-half unit credit.

ART AND INDUSTRY

DOMESTIC ART.

The general aim of this course is to give each girl training to help her to become a better woman, resourceful and adaptable to her surroundings; to develop efficiency and self-dependence, and intensify the interest in all matters pertaining to the home and the extension of its influence.

1. **Plain Sewing.** This course should consider the fundamental principles of hand and machine sewing. Practice of the different hand stitches with direct application to the garment; the use and care of different makes of machines; the drafting of simple patterns and the beginning of the textile industry from the historical and economic standpoint. Each student makes an apron, a suit of underwear and a wash dress. If possible, three, one and one-half hour laboratory periods each week throughout the year.

2. **Dressmaking.** This course includes the making and use of patterns, and the choosing and economic cutting of materials. Beauty and simplicity are emphasized, aiming to create a taste for good in Art and particularly from a hygienic standpoint, in its relation to both home and clothing. Each student makes a skirt and waist of woolen or silk material and a one-piece dress. Three, one and one-half hour laboratory periods each week throughout the second year.

3. **Applied Art.** This course should deal with the application of color and design to textiles; special emphasis on color combinations; the teaching of the fundamental stitches of needlework; the making of household linen; French embroidery; the designing and making of sofa pillows, table covers, waists, etc. Two, one and one-half hour laboratory periods a week through the fourth year.

HOUSEHOLD ARTS.

Domestic Science.

The aim of the work in Household Arts in the High School is a study of the conditions of right living. The contents of the course should be influenced by the particular needs of the community and the subject matter suited to the age and development of the student. The extent and arrangement of courses so far as the curriculum will permit, should be determined by the instructor in charge.

1. **Cooking.** This course should consider clean and economic habits in the handling of food and care of the kitchen. It will include the underlying principles of cookery in their application to food principles and the action of bacteria in food preparation and preservation. Text books: Clark's "Domestic Science," "Household Bacteriology," by Maria Elliot, and "Principles of Cookery," by Anna Barrows.

The following valuable U. S. bulletins may be obtained free of cost:

"Principles of Cookery," by Barrows.

"Food Products of the World," by Green.

"Food and Dietetics," by Hutchinson.

"Food and Its Functions," by Knight.

Two three-hour laboratory periods throughout the year.

2. **Foods.** This course will consider cost and function of food. It will include advanced work in cookery, marketing, preparing and serving meals for a given sum. Text books: "Food and Dietetics," by Norton. One lecture and two two-hour laboratory periods throughout the year.

3. **Sanitation.** The work of this course should be based on the existing conditions of homes and the community. It will include a study of local vital statistics, causes and carriers of disease, methods of removing and preventing insanitary influences in the home; insanitary

habits of the individual; means of protecting the individual from unhealthful conditions. Text books: "Household Hygiene," by Elliott, and "Primer of Sanitation," by Ritchie.

4. **The House.** This course should consider a critical study of house plans—one to be selected for furnishing and decorating. It will include a study of the location, style, material, plans, and furnishing the home from an economic and sanitary standpoint. "The House" by Bevier will serve as a text if supplemented. Five lecture periods per week for one-third year.

5. **Household Art.** This course to be given by the art instructor. Five lecture periods for one-third year.

6. **Home Care of the Sick and Personal Hygiene.** The work of this course should aim to prepare the student to meet the emergency, and fit her for home conditions not requiring a professional nurse, and give her some knowledge of the care of her body. Text books: "Home Care of the Sick," by Pope, and "Personal Hygiene," by LeBosquet. Five lecture periods for one-half year.

7. **Household Administration.** This course should be based on the girl's problem as she fits into the general plan of household administration and aim to give her some knowledge of her economic relations. It will include such problems as: her standards; expense to the household; value of allowance; division and expenditure of allowance; method of keeping personal accounts; cost of clothing, cost of food for one year; how to wash dishes, sweep and dust, etc., most efficiently with the minimum expenditure of time and energy; economy and use of labor saving devices. When possible this is best given as a laboratory course. "Household Management" by Terrell will serve as a text book. Five lecture periods for one-half year.

MECHANICAL DRAWING.**Course A—Freehand.**

Work to be Done. Twenty plates.

1. Small letters.
2. Capital letters.
3. Roman numerals.
4. Arabic numerals.
5. Mixed lettering.
- 6-8. Freehand lines.
- 9-11. Shaded areas.
- 12-15. Line drawings of models.
- 16-19. Shaded drawings of models.
20. Title Plate.

Arrangement of the Plate.

Size—12x15 inches.

Border—Single line.

Margin—One and one-half inches all around.

Markings—Name, date and plate number.

Materials.

Paper—Ordinary white drawing paper.

Pencils—6H and 4H Drawing pencils.

Pens—One-half dozen Gillott's No. 303, and one-half dozen ball-pointed pens.

Penholders—Two penholders with cork grasp.

Erasers—One soft eraser, one ink eraser, one cube of art gum.

Thumb Tacks—One dozen smallest size.

Ink—One bottle of black; one bottle of carmine, (Higgin's or Post's.)

Scales—One architect's triangle scale; one engineer's triangular scale.

T-Square—One 24-inch T-Square (amber edges preferred).

Triangles—One seven-inch 45 degree and one eight-inch 30 degrees (amber preferred).

Pen Wiper—Piece of linen not less than 12 inches square.

Pencil Sharpener—One file or sand paper sharpener.

Course B.—Mechanical.

Work to Be Done. Twenty plates.

- 1-6 Copies of plates 1-6 in Reinhardt's "Technic of Mechanical Drawing."
7. Lettering in paragraphs.
- 8-9. Carpentry drawings.
- 10-11. Valves or machine parts.
12. Geometrical figures.
- 13-14. Irregular curves.
- 15-17. Tinting.
- 18-19. Spatter work.
20. Title plate.

Arrangement of Plates.

Size—12x18 inches.

Border—Double line.

Margin—One and one-half inches all around.

Markings—Name, date, and plate number.

Materials.

Instruments—One set containing at least: One ruling pen (right line pen); one pair of dividers; one compass for pen and pencil.

Paper—Whatman's Hot Pressed, size 27x40 inches.

Curves—One Ann Arbor Irregular Curve. Amber.

Paste—Tube of Library paste or Higgin's Drawing Board Mucilage.

Sponge—One 10c or 15c size.

Water Colors—Carmine and Prussian Blue; one tube or palette of each.

Palettes or cups for mixing colors.

Brushes—One double pointed camel's hair brush, good size.

Also everything in the list for Freehand, except paper.

Reference Books.

Reinhardt's books are perhaps the best books published for the line of work they cover. The chapter on "Working Drawings" in "Mechanical Drawing," by Cross is a good one. (Ginn & Co., publishers.)

Other books recommended are: Mechanical Drawing by Faunce, Boston. Mechanical Drawing, by Anthony; D. C. Heath & Co.

MECHANIC ARTS.

The time given to Mechanic Arts is too short to make the student proficient in any line of work. However, the elementary knowledge of any branch of mechanic arts should be thorough and systematic in its nature, so that

the student may have a good foundation on which to build. Every student should be taught the fundamental principles underlying mechanical work, rather than a smattering of everything.

WOOD WORK.

First Year. Carefully selected progressive exercises, simple household articles, and sharpening of tools. Six hours per week throughout the year. One lecture a week on materials and tools.

Second Year. Sash, doors, simple furniture, staining and finishing, also elementary house building. Six hours per week throughout the year. One lecture a week on the materials and finishings of furniture and houses.

METAL WORK.

Forging. A study of fuels, different kinds of fires and their management. Bending, twisting, drawing, upsetting and welding of iron and mild steel. Calculation of material required for different classes of work. Making of forgings, beginning with simple forms and gradually taking up more complex problems. Metallurgy of iron and steel. Tool steel, its proper heat and treatment, forging, hardening and tempering. The making of tools such as a hammer, punch, cold chisel, hardie, swage, fuller, set hammer. Use of drills, taps, dies, reamers and files.

Reference: "Forge Practice," by J. L. Bacon.

Sheet-Metal Work. The course in sheet-metal work should embrace the drafting of patterns, marking out work with the pattern, cutting the material, forming it into shape and joining the parts and the finishing of the seam and joints by the use of solder or spelter. An elementary study of the manufacture of tin, sheet-iron, galvanized iron, sheet brass and sheet copper, and the proper uses of these materials may be made.

Practice should be given in the making of troughing pipes, elbows, hoppers, and bath tubs. The practice should be employed on pieces of work used in the construction of the modern home. The proper care and use of tools should be emphasized.

Reference: International Library of Technology.

Art Metal Work. Copper and brass. A study of the necessary tools. Problems in design. Cutting with shears and chisel. Chasing flat work. Drilling, perforating and embossing. Making of escutcheons, name plates, drawer pulls, fobs and hinges. Annealing and pickling. Brazing and silver soldering. Raising work with hammer and anvils. Use of snarling iron. Finishing, polishing, coloring and enameling.

Reference: "Copper Work," by Augustus F. Rose.

Plumbing. Flanging, tapering and bending lead pipe. Soldering plain and wiped joints including but, T and Y. Setting of bowls, bath tubs and closet seats with tanks and fittings. Faucets and valves, their construction, operation and disorders. A study of sanitation. Design of complete house system of plumbing and drainage. Placing of iron and tile soil pipe with joints of lead and cement.

Steam and Water Piping. A study of fittings, unions, flanges, nipples, couplings, elbows, tees, bushings, reducers, angle and globe and other valves, right and left hand threads. Measuring and cutting pipe. Threading with tap and die. Capacity of pipes. Use of tables. Calculation of pipes for given flow of water and steam. Designing and placing systems of piping.

References: "Modern Plumbing, Steam and Hot Water Heating," by J. J. Lawler. "Modern Plumbing," by S. B. Starbuck.

Electric Wiring. Units of measurement and calculation of carrying capacity of conductors. Commercial sizes of copper wire and cables. Insulators, knobs, cleats, bushings, conduits, tape, circular loom wall sockets, brackets and their uses. Making of joints and splices. Arrangement and placing of wiring system for electric bells, electric lighting and power transmission. A study of switch boards with arrangement of bussbars and instruments.

Reference: "Wiring Diagrams and Descriptions for Electrical Workers," by Horstmann and Tousley.

The foregoing outlines are suggestive of the various courses that may be given in high schools. Individual schools may select from these courses that which best meets their needs, or they may combine some of these courses, thus reducing the total amount of work and the credit. It is suggested that all boys take not less than one-half unit of this work; and that, as a rule, no student should take more than two units.

DRAWING.

Art training in the high school should accomplish four things.

1. It should develop a sense of good taste in dress, house building, house furnishing, and general decoration.
2. It should inspire appreciation for natural beauty.
3. It should awaken interest in the master artists and their work.
4. It should train the student in artistic expression.

These ends are readily obtained by a competent teacher with good equipment for art study.

To be competent the teacher must know the fundamental principles of art. Harmony, rythm, space relations, atmosphere, perspective, color theory, modes of expression—

all these the teacher must know so well that mere differences in teaching and personality of students cannot confuse the teacher and lead him into a narrow dogmatic method of teaching. There is no short cut to a knowledge of these principles. They are known, or instinctively felt, only through long experience, and association with art.

Equipment for art work in the high school is comparatively easy to obtain. During the first year, drawing pads, pencils, charcoal, pen and ink, for sketching indoors and outdoors, serve very well to give the student a foundation in drafting and art appreciation. In the second year color may be taken up. Still life studies, landscape and life studies form a very good basis for design. It is in design that the student will feel the high utility value of art as well as its aesthetic value.

In the third and fourth years the work should be somewhat more special and technical. Work in antique models, historic costume, color theory, and general art history may be adapted to the needs of schools of any size.

To supplement this work the student should be surrounded with as many art examples and art books from master hands as the school is able to supply.

MUSIC.

The basis of all musical education consists of the knowledge and ability to read and write music. To comprehend the meaning in musical speech a thorough course in the study of tone characteristics, both in relation to scales, intervals and harmonic combinations, is as essential as is the study of words to the enjoyment and understanding of a language. Rote singing is beneficial to the cultivation of a love for music, but stops far short of real development or advancement. The best music can not easily be retained by the memory and a great deal of it can not be learned in any degree except by those who have trained their minds in the

art of reading (without the aid of an instrument) the printed page of music. The name of this subject is "solfegge." Where the high school students have not had a systematic course in "solfegge" in the grades, the third and fourth year students should have at least two recitations weekly, strictly on this subject. If their educational course points to normal work and the acquirement of a teacher's certificate, this amount of this kind of work is indispensable.

A chorus class, meeting once a week, and an orchestral club, meeting twice a week throughout the four years, is desirable for the social welfare of the school and also profitable to the students. An instructor with special qualifications for this work should be engaged—one who can raise the musical department to a position of dignity.

Where a high school has received its pupils from grade schools which have not neglected systematic instruction in "solfegge," at least one year of "advanced review solfegge" should be given, together with the singing and instrumental societies above mentioned. Where the school is provided with a professional musical instructor of high standing a course in musical history with lecture recitals would form a splendid addition to the above.

COMMERCIAL GEOGRAPHY.

Commercial Geography has to do with the earth as an agent in the production of commodities upon which human life depends. The aim should be to give an account of the physical features, the products and the trade of the world. Particular emphasis should be laid upon the United States of America. In dealing with foreign countries the best plan is to treat them and their products in relation to our own country.

The plan followed here is to treat the commerce of each country under the following heads: First, physical basis;

second, the people; third, the products; and fourth, the trade.

I. Climate and Commerce.

- a. Temperature.
- b. Isotherms.
- c. Trade winds.
- d. Rainfall.
- e. Irrigation.
- f. Climatic features of the United States.

II. Forestry.

- a. Forest and rainfall.
- b. Forest and irrigation.
- c. Forest products.
- d. Forestry as a science.

III. Regional Geography of the United States.

- a. Atlantic.
- b. Appalachian region.
- c. Mississippi valley.
- d. Great Plains.
- e. Rocky Mountain and Great Basin.
- f. Pacific Slope.

IV. Man and Commerce.

- a. Primitive man.
- b. Civilized man.

V. Mineral Products.

- a. Iron.
- b. Copper.
- c. Lead and zinc.
- d. Tin.
- e. Gold.
- f. Silver.
- g. Platinum.
- h. Mercury.
- i. Coal.

VI. Vegetable Products.

- a. Corn.
- b. Wheat.
- c. Barley.
- d. Oats.
- e. Buckwheat.
- f. Rice.
- g. Sugar.
- h. Fruit.
- i. Tobacco.
- j. Hops.

VII. Animal Products.

- a. Cattle.
- b. Horses and Mules.
- c. Poultry.
- d. Hogs.
- e. Sheep and Wool.
- f. Fish.

VIII. International Commerce of the United States.

- a. Railroad Transportation.
- b. Motor transportation.
- c. Wagon transportation.
- d. Movement of live stock.
- e. Grain and farm products.
- f. Trade of the United States with the Philippine Islands, Hawaii and Porto Rico.

IX. Resources and products of Mexico, Central and South America should be treated in comparison with the products of the United States as far as possible.

X. A similar study should be made of the products of Europe, Asia and Africa, paying especial attention to those which are imported into the United States and used here in primary or secondary consumption.

BOOKKEEPING.

a. Bookkeeping and Accounting. (Elementary.)

The aim of this and the following courses should be to train the student in the art of bookkeeping along the basic lines of accountancy. The completion of these courses should not only qualify for a high degree of efficiency in the art of bookkeeping, but it should also lead up to a very thorough understanding of the general principles and practices of accountancy.

The student should be required to work out a number of sets along various lines illustrative of the principles studied. It should be a course in theory primarily, and it should be strictly modern in that the student classifies and enters the transactions in the books in which they belong, from the start. Purchases, sales, notes and acceptances, cash receipts and payments, etc., are entered directly in their respective books from which their proper accounts in the ledger are debited or credited. The trading, and profit and loss statements, statements of resources and liabilities, and the other statements, analysis sheets, etc., are required in connection with each set and conform strictly to established professional forms employed by accountants. Special attention is also paid to ledger closings, the grouping of accounts, the use of controlling accounts, the analysis of accounts, and the preparation of statements.

b. Bookkeeping and Business Office Practice. (Advanced.)

This course follows logically Course a. It should consist of the working out of a number of prepared budgets, such as wholesale, manufacturing, cost accounting, voucher accounting, banking, and branch stores.

STENOGRAPHY AND TYPEWRITING.

In a four year course in stenography and typewriting no stenography need be given the first year, as it is far pref-

erable to have the student take a good course in Business Correspondence and also a course in Penmanship about the same amount of time. Typewriting may be given at the same time.

During the second year of a business course a five-hour course in Stenography should be given together with a second five-hour course in Typewriting. This should complete his course in typewriting in so far as actual instruction is necessary and will leave the student, during his second year in Stenography, qualified to transcribe the work given the following year in Stenography II, on the typewriter, as it should be done.

In the third year Stenography II should be given. This should also be a five-hour course. No regular typewriting course is needed this year as the student will get plenty of practice on the machine in connection with his second year in Stenography.

During the fourth year an advanced course in Stenography may be given. This should receive three two-hour periods per week and should consist largely of actual business practice, reporting work, etc., placing the student in practically the same positions as would probably be met with in the business world. This course, like stenography II, would require considerable work in typewriting so that no regular course need be given in this subject.

In Stenography, one of the standard shaded line systems, such as Graham or one of the Pitmanic systems, should be taught. Good text books are always obtainable for either of these standard systems. The touch system of typewriting should be taught, as this has proved to be of far greater worth than any other. Text-books for typewriting are also easily obtained.

Every student in Stenography and Typewriting should take at least one course in English each year, completing the

requirements up to and including higher rhetoric and composition, and where possible, should also be given an additional course in business English.

Penmanship.

This course should aim to develop a practical handwriting. Much stress should be laid on movement of the hand and position of the hand and body. Beginning with easy movement drills, the student is led into more difficult exercises, completing with words and short sentences. Designed for first year students.

Business Correspondence and Spelling.

This course aims to instruct the student in the methods of business men and in the management of business affairs. The student is called upon to meet actual business problems in the way in which they must be met in actual business. It gives practical exercises in correct commercial correspondence and develops a technical business vocabulary for the student. The course is designed for the first year students.

Stenography.

This is a thorough, practical course, designed for the purpose of preparing the student for actual work. After the principles of the text are mastered, the dictation of commercial correspondence is taken up. Graham's Phonography, one of the most successful of the many excellent Pitmanic systems, is taught. Prerequisites—Penmanship and Commercial Correspondence.

2. After a thorough review of the text books, advanced correspondence work, legal documents, speeches, court testimony, etc., are taken up. The course is especially designed to fit the student for high grade office work and to fill the demand for efficient secretaries. Much transcribing on the typewriter is required.

3. This is an advanced course for those who wish to qualify for positions as reporters, etc. The course will consist largely in a study of public meetings, court proceedings, and the reporting of speeches, trials, etc. A study of technical phraseology and reporting methods will also receive attention. Practically all work will be transcribed on the typewriter. Prerequisite—Stenography 2.

Typewriting.

1. Beginning with the simple exercises, the student learns correct fingering and the proper manipulation of the typewriter. Special attention is given to the care and the mechanism of the machine.

2. A special course for those taking Stenography and those who wish advanced work along this line. In addition to the elementary principles in Typewriting 1, students make copies of correctly written correspondence, legal forms, etc.; also personal composition and dictation. As soon as moderate speed is attained, the work includes transcription of shorthand notes.

PHYSICAL EDUCATION.

Systematic instruction in this subject is strongly urged for the whole high school period for the sake of its own value.

The play instinct should be fostered, developed, and guided. The games chiefly to be encouraged are those that are suited for the many—games of comparatively low organization with large and indefinite number of participants. From these a gradual transition may be made towards the highly specialized national games: baseball, basketball, football, although it is doubtful whether the two latter, as usually played, are of real value in the high school.

Competition in track and field events should be arranged between groups, not between individuals, in order

that those least strong, least speedy, least developed shall be induced to improve their condition and thus raise the general average of their respective groups. In accord with this prizes should have little or no intrinsic value, and be awarded to the group, class, school, rather than to the individual.

For the girls the competitive element should be minimized. Competitions before large audiences are detrimental to the moral as well as the physical well-being of the girls. The track events usual for boys should at least not be encouraged. In their place and instead of the more complicated games of the boys we recommend various forms of the dances now in common use as a part of physical training.

Formal gymnastic should supplement the freer activities to secure voluntary control, erect carriage, and all-sided activity. Better results are gained by frequent short periods than by few ones of longer duration. For practical reasons we suggest a minimum of three weekly periods of 45 minutes. These periods should not encroach on the time for free or supervised play.

APPENDIX A

Apparatus and Materials for the Equipment of Science Laboratories.

The following lists of apparatus and materials represent the minimum requirement in equipment for the courses here represented. The state high school authorities are invited to confer with the University of Utah and the Agricultural College of Utah in regard to the selection of additional apparatus and the purchase of apparatus and supplies.

Where no quantities are given, one is to be understood.

CHEMISTRY.

(For General Use.)

Apparatus.

Balance (\$15.00).

Thermometer, centigrade, 360 degrees.

Hoffman's Electrolysis Apparatus (requires direct current).

Burette, 50 cc. (glass stoppered).

Pipettes, 3 (10, 25, 50 cc).

Hard glass tubing (one-half inch) 10 feet.

Magnet.

Chemicals.

Acid, sulphuric, 27 pounds (3 bottles).

Acid, hydrochloric, 30 pounds (5 bottles).

Acid, nitric, 21 pounds (3 bottles).

Acid, acetic, 1 pound.

Acid, phosphoric, onehalf pound.

Acid, tartaric, 1 pound.

Acid, oxalic, 1 pound.

Metallic aluminum, 1 pound.

Metallic zinc, 10 pounds.

Iron (filings), 1 pound.

Copper, 5 pounds.

Lead (foil), 2 pounds.

Sodium, $\frac{1}{4}$ pound.

Tin, 1 pound.

Silver, 1 ounce.

Arsenic, $\frac{1}{2}$ pound.

Antimony, $\frac{1}{2}$ pound.

Mercury, 2 pounds.

Sulphur, 5 pounds.

Ammonium chloride, 5 pounds.

Ammonium nitrate, 2 pounds.

Ammonium hydroxide, $22\frac{1}{2}$ pounds (5 bottles).

Ammonium sulphate, 2 pounds.

Alum, potash, 2 pounds.

Alum, chrome, 1 pound.

Alcohol, ethyl, $\frac{1}{2}$ gallon.

Arsenic trioxide, 2 pounds.

Antimony, trioxide, 1 pound.

Barium, chloride, 5 pounds.

Barium, nitrate, 1 pound.

Barium peroxide, 2 pounds.

Bismuth nitrate, 1 pound.

Manganese dioxide (lump), 5 pounds.

Manganese dioxide (powered), 1 pound.

Manganese sulphate, $\frac{1}{2}$ pound.

Mercuric chloride, $\frac{1}{2}$ pound.

Mercuric oxide, 1 pound.

Borax, powdered, 2 pounds.

Bromine, $\frac{1}{4}$ pound.

Iodine, $\frac{1}{4}$ pound.

Phosphorus, yellow, $\frac{1}{4}$ pound.

Phosphorus, red, $\frac{1}{2}$ pound.

Ferrous sulphide, 5 pounds.

Potassium bromide, 1 pound.

“ chloride, 1 pound.

“ iodide, $\frac{1}{2}$ pound.

“ hydroxide, 2 pounds.

“ cyanide, $\frac{1}{2}$ pound.

“ chromate, $\frac{1}{2}$ pound.

‘ thiocyanate, $\frac{1}{4}$ pound.

Marble, 10 pounds.

Calcium chloride, 2 pounds.

Calcium sulphate (gypsum), 2 pounds.

Carbon disulphide, 2 pounds.

Cobalt nitrate, $\frac{1}{2}$ pound.

Copper sulphate, 2 pounds.

Copper nitrate, 1 pound.

Ferric chloride, $\frac{1}{2}$ pound.

Ferrous sulphate, 2 pounds.

Litharge, 1 pound.

Lead peroxide, 1 pound.

Lead nitrate, 2 pounds.

Litmus paper (red and blue) 1 quire each.

Indigo, 1 ounce.

Magnesium ribbon, 10 feet.

Magnesium sulphate, $\frac{1}{2}$ pound.

Magnesium carbonate (magnesite), 2 pounds.

Potassium dichromate, 2 pounds.

Potassium permanganate, 1 pound.

Potassium nitrate, 5 pounds.

Potassium sulphate, $\frac{1}{2}$ pound.

Potassium chlorate, 5 pounds.

Potassium ferrocyanide, $\frac{1}{4}$ pound.

Potassium bitartate, $\frac{1}{4}$ pound.

Silver nitrate, $\frac{1}{4}$ pound.

Cadmium sulphate, $\frac{1}{4}$ pound.

Sodium chloride (common salt), 10 pounds.

“ hydroxide, 5 pounds.

“ carbonate, crystals, 5 pounds.

“ bicarbonate, 2 pounds.

“ sulphate, 1 pound.

“ thiosulphate, 1 pound.

“ acetate, crystals, 1 pound.

“ hydrogen phosphate, 1 pound.

Sodium nitrate, 1 pound.

Nickel nitrate, $\frac{1}{4}$ pound.

Stannous chloride, $\frac{1}{4}$ pound.

Zinc sulphate, 1 pound.

Strontium nitrate, $\frac{1}{4}$ pound.

Order technical, or commercial, grade of chemicals where possible.

Above material ample for class of 10 students.

(For individual use of each student.)

Articles Returnable.

Two 50 cc. beaker.

Two 125 cc. beaker.

Two 300 cc. beaker.

One blowpipe.

Four bottles 8 oz. saltmoths.

One Bunsen burner.

One clamp, small, with holder.

One clamp test tube.

One cobalt glass.

One cork-borer.

One crucible porcelain 15 cc.

One cylinder, graduated 100 cc.

One deflagrating spoon.

Two dishes, porcelain, 50 cc.

One dish, porcelain, 200 cc.

One flask, 100 cc.

One flask, 250 cc.

One flask, 500 cc.

One flask, 1000 cc.

One forceps, iron.

Two funnels, 8 cm.

One funnel Thistle tube.

One mortar and pestle, 4 inch.

One sand bath.

One spatula horn.

One support retort, 3 ring.

One support funnel.

One support test tube.

Twelve test tubes, 6 inch.

One tongs, crucible iron.

One tripod.

One trough, pneumatic.

Two watch glass 7.5 cm.

One watch glass 10 cm.

One wing top.

Keys to desk.

Articles Not Returnable.

One box of matches.

One file, triamgular.

One file, round.

One filter paper, qualitative 11 cm.

Two-foot glass rod.

One gas tubing for Bunsen burner.

Five-foot glass tubing.

One No. 6 rubber stopper.

Six-inch rubber tubing.

One stick charcoal.

One test tube brush.

One towel.

One wire gauze.

One platinum wire.

The above equipment for Chemistry should be obtainable for about \$350 to \$400.

PHYSICS.

One mirror, convex and concave.

One flint glass prism, 4 inch.

One set lenses.

One double convex lens, 3 in. diameter, 7 in. focus.

One double concave lens, 2 in. diameter, 8 in. focus.

One double convex lens, 1½ in. diameter, 8-in. focus.

One double convex lens, 1½ in. diameter, 4-in. focus.

One optical disk, improved model.

One Geryk pump No. 1.

One pump plate of glass, 10 in. diameter on tripod, with stopcock, with opening in cock form of T, so as to admit from outside into receiver.

One bell glass.

One bell in Vacuo.

One Bacchus illustration.

One rotator.

One centrifugal hoop.

One center of gravity apparatus.

One siren disk.

One Newton's disk.

One manometric flame apparatus.

Eight ounces copper magnet wire No. 24 D. C. C.

Eight ounces copper magnet wire No. 20 D. C. C.

One set of equilibrium tubes.

One Tantalus cup.

One convection apparatus.

One pair bar magnets.

One electro-magnet.

Two horse shoe magnets.

One magnetic needle mounted on stand.

One hollow brass cylinder 1 in. long by $\frac{3}{4}$ in. outside diam. to be made from piece brass tubing with 1-16 in. wall (for Exp. 4 of Lab. Manual).

Three glass U tubes $\frac{5}{8}$ in. diam., 6 in. long.

One piece glass mirror 3x4 in.

Two triangular files.

Three brass discs turned true from 1-16 in. plate, 1 each about $2\frac{1}{2}$ in. x $4\frac{1}{2}$ in. and $6\frac{1}{2}$ in. (for Exp. 2b).

One steel plate about $1 \times 6\frac{1}{8}$ in. smooth on one side with fine lines drawn lengthwise along the middle (Exp. 1).

One Weston voltmeter, round type, 3-volt scale.

One pulley of hardwood.

Two barometer tubes.

Ten pounds mercury and container.

Two demonstration hydrometers, wood.

One hydrometer for heavy liquids.

One hydrometer for light liquids.

Four five-foot lengths soft glass tubing $1\frac{3}{8}$ in. for Resonance and Kundt's tubes.

Two pieces glass tubing, each 2x20 cm.

Four lengths soft glass tubing $\frac{1}{4}$ in. diameter 5-16 in. diameter, $\frac{3}{8}$ in. diameter, and $\frac{1}{2}$ in. diameter.

Two 12-foot lengths antimony rubber tube, $\frac{1}{4}$ in.

Twelve feet white rubber tubing, 5-16 in. diameter.

Twelve feet white rubber tubing, $\frac{3}{8}$ in. diameter.

Twelve feet white rubber tubing, $\frac{1}{2}$ in. diameter.

One hardwood support, Schellback's universal movement.

Two Burette supports.

One funnel holder.

Two iron supports, medium.

One iron support, large.

One Burette clamp.

One Universal condenser clamp.

Two condenser clamps.

Three clamp holders.

One glass funnel, 3 in.

One glass funnel, 4 in.

One steel forcep.

One brass crucible tongs.

Two iron tripods.

One mercury trough.

Two alcohol lamps 4 ounces.

Two alcohol lamps 8 ounces.

Three pieces wire gauze brass 5x5 in.

One percolator funnel 1 qt. capacity.

(For sound resonator tube apparatus.)

One tuning fork C128.

Two tuning forks C 256.

One tuning fork C 512.

Four tuning forks giving major chord.

One tuning fork D 288.

Three rubber hammers for striking tuning forks.

One sonometer, with four wires, two of the size of 1 and 2 of another size, all suitable for this instrument.

One brass rod 1 meter long and about $\frac{3}{8}$ in. diameter, for Kundt's apparatus.

One ditto, aluminum.

Two apparatus "A" (hypsometer).

Three water traps.

Two air thermometers, Galelio pattern.

Six chemical thermometers, scale on stem, 10 degrees to 110 degrees C, graduated in degrees.

Three meter sticks.

One Vernier caliper.

One micrometer caliper.

Two cylindrical glass graduates 100 cc.

Two ditto, 200 cc.

One inside caliper, 6 in.

One nickel-plated brass cylinder on foot about 3.5 cm. diam. x 16 cm. high, made by soldering a brass plate on one of the tubes. Must be of uniform diameter and plane bottom.

Two Harvard trip balance.

One set brass weight 1 to 500 g.

One set brass weight 1 to 1000 g.

Two sets brass weights 1 to 50 ctgm.

One balance, sensitive to 1 mg.

One hydrostatic balance.

One set weights 1 mg. to 50 gr.

Three spring balance 250 gr. capacity.

One spring balance English and metric scales, 30 lbs. capacity.

One spring balance 2000 gr. capacity.

One brass protractor.

Three pair Eagle pencil compasses.

Three diagonal metric scales, boxwood.

Six metric rulers, 30 cm.

Two Erdmann's Burette floats W-glass points.

Five pounds lead shot about No. 4.

One cast iron ball 3 in. diam. drilled (for centrifugal experiment).

One steel ball for acceleration $1\frac{1}{2}$ in.

One brass ball $1\frac{1}{2}$ in. for pendulum.

Three cast iron balls, drilled, 1 in.

Two hardwood balls, drilled, 1 in.

One pendulum clamp.

Three levers.

Three wood prisms.

One Hall's carriage for inclined plane.

One wheel and axle, 3 diameters to screw to table or bench 9 in.

Three pulleys, single, with hook.

One second's pendulum.

One testing machine for tensile strength of wire, complete.

Three spools iron wire, 1 each No. 24, 26 and 28.

One spool brass wire, No. 24.

One ditto, No. 26.

One ditto, No. 28.

Two hydrometer jars with lip 10x2 in.

One ditto 15x3 in.

One ditto 3x18 in.

One hollow brass tube about $\frac{3}{4}$ in. diam. and 2 in. long closed squarely at each end.

Three sp. gr. bottles 25 cc, ungraduated.

One Boyles Law apparatus.

One three-scale thermometer.

One linear expansion apparatus.

One brass rod for expansion apparatus.

One aluminum rod for expansion apparatus.

One calorimeter (for sq. heat).

Two calorimeters (to be encased in larger cup with covers for latent heat determinations).

One lb. copper shot for specific heat.

One electric machine.

One electroscope.

One glass friction rod.

One vulcanite friction rod.

Six pith balls.

One pith ball electroscope on stand.

One discharger.

One brass chain.

One Leyden jar with moveable coatings.

One hollow globe.

One induction cylinder.

One proof plane.

One electric whirl.

One Universal support.

One electric chime.

One holder for Geissler tubes.

One Geissler tube 8 in.

One electric plume.

Six dry cells.

One Samson battery.

One Daniell battery.

One pound bottle concentrated sulphuric acid.

One zinc rod.

One carbon rod.

One copper rod.

One tin rod.

One iron rod.

(Above rods are all of same diameter approximately for E. M. F. Series).

Two thick-walled glass tumblers with straight sides to be used in making cells for the above material.

Two feet each of Nos. 3, 6, 10 and 14 bare copper wire.

One square foot sheet zinc about 1-16 in.

One sheet copper 4x6 in. about 1-24 in.

One primary and secondary coil.

One electrolysis of water apparatus.

One stand for above.

Three Mohrs clamps.

One telegraph instrument.

Two galvanoscopes.

One student's D'Arsonval galvanometer.

One resistance box and bridge combined.

One contact key.

One electric bell.

Ten binding posts, wood screw.

One hundred feet bare German silver wire No. 22.

Fifty feet ditto No. 20.

(The last three items are to be used in making a resistance board, as per Lab. Manual, Experiment XXX.)

PHYSIOLOGY.

Individual.

Bunsen burner.

Test-tube stand.

Ten test tubes.

Funnel stand.

Funnel 3 inch.

Tripod.

Mortar and pestle.

Erlenmeyer flask 100 cc.

Porcelain dish 4½ inch.

Two beakers 4-oz. and 8-oz.

Stirring rod.

Graduate 100 cc.

Pipette 5 cc.

Wire gauze 5x5 in.

Twenty-five filter papers, 5 in.

Matches, one box.

Group of Four.

Iron stand.

Double clamp.

Burette.

Glass plate 5x5 in.

Frog board with spring clips.

Granite pan, shallow.

Thermometer, 0-100 Cent.

Small dissecting set.

Class (for Demonstration Purposes).

Induction coil.

Platinum electrodes.

One pair brass electrodes.

Simple key.

Short-circuiting key.

Signal magnet.

Muscle lever, light.

Three writing levers.

Kymograph.

Kymograph paper, 50 sheets.

Two heart levers.

Model respiration scheme (Porter) \$2.00.

Model circulation scheme (Porter) \$5.00.

Ergograph (Porter) \$1.50.

Tuning fork.

Balance 5-1000 grams.

Compound microscope.

Charts.

Chemicals and biological materials sufficient for the use of the above apparatus are to be included.

ZOOLOGY.

(Minimum for class of Twelve.)

One compound microscope.

Twelve dissecting microscopes.

Twelve dissecting pans, wax bottoms.

Twelve dissecting sets.

Six alcohol lamps.

Twenty-four tumblers.

Twelve pint jars.

Twenty-four dropping bottles.

Twelve collecting bottles.

Twelve Syracuse watch glasses.

Six beakers 1½ ounces.

Twenty-four test tubes, 4x½.

Three test tube brushes.

One graduated cylinder, 100 cc.

One gross assorted corks.

One chemical thermometer.

One box glass slides.

One ounce cover glasses, No. 2, ¾ in.

One section razor.

250 grams ether or chloroform.

125 cc. nitric acid.

125 cc. sulphuric acid.

125 cc. hydrochloric acid.

Ten grams eosin, dry.

One gallon ethyl alcohol.

One gallon methyl alcohol (wood).

100 grams absolute alcohol.

250 grams sodium or potassium hydrate.

One-half gallon formaline.

Fifty grams glycerine.

Twenty-five grams chromic acid crystals.

Twenty-five grams corrosive sublimate.

Two ounces Canada Balsam.

Twenty-five cc. haematoxylin (Delafield's).

Twenty-five cc. borax carmine (Grenacher's).

Ten grams methyl green, dry.

250 grams xylol C. P.

A hand microtome, a 5-gal. aquarium jar, and a few battery jars or smaller aquaria are very desirable additions to the above list. A compound microscope for each two students should be provided, if possible.

BOTANY.

For a class of twelve in Botany, add:

Five compound microscopes (making one for each two students).

Ten grams iodine (crystals).

And omit:

Twenty-five grams potassium iodide.

Dissecting pans.

Ether or chloroform.

Chromic acid.

Corrosive sublimate.

For either class the following are desirable additions:

Twelve assorted, 1 and 2 hole rubber stoppers.

One pound glass tubing, $\frac{1}{4}$ in.

Ten feet rubber tubing, $\frac{1}{4}$ in.

One porcelain mortar.

One funnel, 4 in.

Two packages filter paper, 4 in.

One small balance, with weights.

Two ring stands, 3 ring.

Three culture slides.

TEXT BOOKS, Books adopted as Basal and Supplementary Texts for Use in the Schools	Exchange Price	Introductory Price	Wholesale Price F. O. B. Point Shipm't	Wholesale Price F. O. B. Salt Lake City	Retail Price
High School Books					
1. AGRICULTURE.					
THE MACMILLAN CO, San Francisco, Cal.					
Paddock & Whipple Fruit Growing in Arid Regions	1.05	1.50	1.13	1.27	1.50
Widtsoe's Dry Farming	1.05	1.50	1.13	1.27	1.50
WEBB PUBLISHING CO., St. Paul, Minn.					
Field Crops: Wilson & Warburton	.90	1.14	1.20	1.26	1.50
Supplementary.					
GINN & CO., Chicago, Ill.					
FERGUSON PUB. CO., Sherman, Tex.					
Ferguson & Lewis Elementary Principles of Agriculture			.52	.54	.60
Country Life Series:					
Plumb: Types and Breeds of Farm Animals		2.00	1.60	1.80	2.00
Davenport: Principles of Breeding		2.50	2.00	2.25	2.50
Duggar: Fungous Diseases of Plants		2.00	1.60	1.80	2.00
Hopkins: Soil Fertility and Permanent Agriculture		2.25	1.80	2.03	2.25
Robinson: Principles and Practice of Poultry Culture		2.50	2.00	2.25	2.50
Doane: Sheep Feeding and Farm Management		1.00	.80	.90	1.00
Davenport: Domesticated Animals and Plants		1.25	1.00	1.13	1.25
Carver: Rural Economics		1.30	1.04	1.17	1.30
THE MACMILLAN COMPANY.					
The Rural Science and Rural Text Book Series:					
Warren: Elements of Agriculture			.83	.93	1.10
Duggar: Physiology of Plant Production			1.20	1.36	1.60
Lyon & Fippin: Principles of Soil Management			1.32	1.49	1.75
Duggar: Southern Field Crops.			1.32	1.49	1.75
Recommended for Use:					
Utah Agricultural College Elementary Agriculture Bulletins					

TEXT BOOKS, Books adopted as Basal and Supplementary Texts for Use in the Schools	Exchange Price	Introductory Price	Wholesale Price F. O. B. Point Shipm't	Wholesale Price F. O. B. Salt Lake City	Retail Price
WEBB PUBLISHING COMPANY. Soils and Soil Fertility—Whiston & Walster Beginnings in Animal Husbandry— Plumb		.95 .95	1.00 1.00		1.25 1.25
2. ALGEBRA.					
D. C. HEATH & CO., Chicago, Ill. Wells & Hart New High School Algebra	.72	1.20	.90	1.00	1.20
3. ART AND INDUSTRY.					
WEBB PUBLISHING CO., St. Paul, Minn. Sewing Tablets—Blair: No. 6 for 9th Grade No. 7 for 10th Grade	.35 .35	.45 .45	.48 .48	.50 .50	
LITTLE, BROWN & CO., BOSTON. Clark's Domestic Science	.50	1.00	.75	.80	1.00
4. BOTANY.					
GINN & COMPANY. Bergen & Caldwell's Practical Bot- any	.78	1.30	.98	1.08	1.30
AMERICAN BOOK COMPANY. Andrews' Practical Course in Bot- any	.75	1.25	.93	1.05	1.25
Supplementary.					
NEW ERA PRINTING CO., Lancas- ter, Pa. Garrett's Spring Flora of the Wa- satch Regions			.80		1.00
AMERICAN BOOK CO., Chicago, Ill. Payne's Manual of Experimental Botany			.63		.75
5: BOOKKEEPING.					
LYONS & CARNAHAN, Chicago, Ill Lyons' Bookkeeping: Text Complete Text Part I Text Part II Outfit Part I Outfit Part II	.70 .56 .32	1.00 .60 .45 1.20 .80	.72 .57.6 .32.4 86.4 57 6	.82 .67 .38 1.10 .75	1.00 .80 .45 1.20 .80

TEXT BOOKS, Books adopted as Basal and Supplementary Texts for Use in the Schools	Exchange Price	Introductory Price	Wholesale Price F. O. B. Point Shipm't	Wholesale Price F. O. B. Salt Lake City	Retail Price
Wholesale Accounting		2.00	1.44	1.75	2.00
Mercantile Accounting		1.60	1.15	1.40	1.60
Modern Corporation Accounting ..		1.25	.90	1.06	1.25
Lyons' Commercial Law			.70		1.00
Lyon's Commercial Business Eng- lish	.56	.80	.58	.66	.80
Commercial Arithmetic.					
AMERICAN BOOK COMPANY.					
Van Tuyl's Complete Business Arithmetic	.60	1.00	.75	.84	1.00
6. CHEMISTRY.					
ALLYN & BACON, Chicago, Ill.					
Brownlee's First Principles of Chemistry	.75	1.25	.94	1.04	1.25
Laboratory Manual					.50
Blanchard's Laboratory Manual.					.50
7. CIVICS.					
HOUGHTON, MIFFLIN & CO.					
Guitteau's Government and Politics of the U. S.	.60	1.00	.75	.85	1.00
THE MACMILLAN COMPANY.					
Recommended for Use:					
Ashley's American Federal State..			1.50	1.70	2.00
8. ECONOMICS.					
SILVER, BURDETT & CO., Chicago, Ill.					
Recommended for Use:					
Bullock's Elements of Economics..	.60	1.00	.75		1.00
9. ENGLISH.					
ALLYN & BACON, Chicago, Ill.					
Scott & Denney's Elementary Com- position	.48	.80	.60	.67	.80
Scott & Denney's New Composi- tion Rhetoric	.72	1.20	.90	1.00	1.20
GINN & CO., Chicago, Ill.					
Hanson's Two-Year Course in Eng- lish Composition	.54	.90	.72	.81	.90
Long's English Literature	.81	1.35	1.01	1.13	1.35

TEXT BOOKS, Books adopted as Basal and Supplementary Texts for Use in the Schools	Exchange Price	Introductory Price	Wholesale Price F. O. B. Point Shipm't	Wholesale Price F. O. B. Salt Lake City	Retail Price
SCOTT, FORESMAN & CO., Chi- cago, Ill. Herrick & Damon's New Composi- tion and Rhetoric	.50	1.00	.75	.83	1.00
Newcomer's American Literature.	.50	1.00	.75	.83	1.00
ROW, PETERSON & CO., Chicago, Ill. Practical English—Scott	.25	.45	.36	.38	.45
D. C. HEATH & CO., Chicago, Ill. Sandwick High School Word Book.	.24	.40	.30	.34	.40
Wooley's Handbook of English Composition	.42	.70	.53	.59	.70
Supplementary.					
ALLYN & BACON, Chicago, Ill. Gowdy's English Grammar		.80	.60	.67	.80
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